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RP 272

Idaho Statewide Freight Data and Commodity Supply-Chain Analysis

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Prepared for
Idaho Transportation Department
Research Program, Contracting Services,
Highways Construction and Operations
[ITD Research Program Website](#)

September 2019

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1. Report No. FHWA-ID-19-272	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Idaho Statewide Freight Data and Commodity Supply-Chain Analysis		5. Report Date July 2019	
		6. Performing Organization Code	
7. Author(s) Eric L. Jessup, Washington State University Sal Hernandez, Oregon State University (ORCID# 0000-0001-8160-5949) Jason C. Anderson, Oregon State University Suzette Galinato, Washington State University		8. Performing Organization Report No.	
9. Performing Organization Name and Address Washington State University Oregon State University		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. OSY-2018-01, WSU-2018-01	
12. Sponsoring Agency Name and Address Idaho Transportation Department (SPR) Research Program, Contracting Services, Highways Construction and Operations PO Box 7129 Boise, ID 83707-7129		13. Type of Report and Period Covered Final Report 10/01/2017 – 09/30/2019	
		14. Sponsoring Agency Code RP 272	
15. Supplementary Notes Project performed in cooperation with the Idaho Transportation Department and Federal Highway Administration.			
16. Abstract <p>This focus of this study commissioned by the Idaho Transportation Department Freight Office is on developing freight data that allows for a detailed understanding freight movement within and through the state and an improved understanding of the key freight supply-chains supporting the state's economy. Choices regarding infrastructure improvements are better leveraged with this type of information given limited state transportation budgets and increasing transportation infrastructure needs. This study is unique in the sense that it incorporates vehicle specific transponder data from the private technology firm EROADs, in addition to traditional freight data collection techniques utilizing shipper and establishment questionnaires.</p> <p>In order to obtain very detailed, supply-chain specific information such as trip details, routes, highways used, specific origin/destination, etc., a very detailed and costly survey must be conducted within each supply-chain in the state. These data collection efforts are normally cost-prohibitive at the state or local level which is the reason this study attempted to leverage private transponder data. The transponder information provided very detailed information for the small portion of the truck population on Idaho roadways utilizing an EROADs transponder. As more and more freight carriers and shippers install these transponders on freight vehicles, (as required under electronic log devices mandates), this information will become more encompassing across all state industries and supply-chains.</p>			
17. Key Words Freight Data, Supply-Chains, Transponder Data		18. Distribution Statement Copies available online at ITD Research Program Website	
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages 253	22. Price None

FHWA Form F 1700.7

METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS					APPROXIMATE CONVERSIONS FROM SI UNITS				
Symbol	When You Know	Multiply By	To Find	Symbol	Symbol	When You Know	Multiply By	To Find	Symbol
<u>LENGTH</u>					<u>LENGTH</u>				
in	inches	25.4	millimeters	mm	mm	millimeters	0.039	inches	in
ft	feet	0.3048	meters	m	m	meters	3.28	feet	ft
yd	yards	0.914	meters	m	m	meters	1.09	yards	yd
mi	miles (statute)	1.61	kilometers	km	km	kilometers	0.621	miles (statute)	mi
<u>AREA</u>					<u>AREA</u>				
in ²	square inches	645.2	millimeters squared	cm ²	mm ²	millimeters squared	0.0016	square inches	in ²
ft ²	square feet	0.0929	meters squared	m ²	m ²	meters squared	10.764	square feet	ft ²
yd ²	square yards	0.836	meters squared	m ²	km ²	kilometers squared	0.39	square miles	mi ²
mi ²	square miles	2.59	kilometers squared	km ²	ha	hectares (10,000 m ²)	2.471	acres	ac
ac	acres	0.4046	hectares	ha					
<u>MASS (weight)</u>					<u>MASS (weight)</u>				
oz	Ounces (avdp)	28.35	grams	g	g	grams	0.0353	Ounces (avdp)	oz
lb	Pounds (avdp)	0.454	kilograms	kg	kg	kilograms	2.205	Pounds (avdp)	lb
T	Short tons (2000 lb)	0.907	megagrams	mg	mg	megagrams (1000 kg)	1.103	short tons	T
<u>VOLUME</u>					<u>VOLUME</u>				
fl oz	fluid ounces (US)	29.57	milliliters	mL	mL	milliliters	0.034	fluid ounces (US)	fl oz
gal	Gallons (liq)	3.785	liters	liters	liters	liters	0.264	Gallons (liq)	gal
ft ³	cubic feet	0.0283	meters cubed	m ³	m ³	meters cubed	35.315	cubic feet	ft ³
yd ³	cubic yards	0.765	meters cubed	m ³	m ³	meters cubed	1.308	cubic yards	yd ³
Note: Volumes greater than 1000 L shall be shown in m ³									
<u>TEMPERATURE (exact)</u>					<u>TEMPERATURE (exact)</u>				
°F	Fahrenheit temperature	5/9 (°F-32)	Celsius temperature	°C	°C	Celsius temperature	9/5 °C+32	Fahrenheit temperature	°F
<u>ILLUMINATION</u>					<u>ILLUMINATION</u>				
fc	Foot-candles	10.76	lux	lx	lx	lux	0.0929	foot-candles	fc
fl	foot-lamberts	3.426	candela/m ²	cd/cm ²	cd/cm ²	candela/m ²	0.2919	foot-lamberts	fl
<u>FORCE and PRESSURE or STRESS</u>					<u>FORCE and PRESSURE or STRESS</u>				
lbf	pound-force	4.45	newtons	N	N	newtons	0.225	pound-force	lbf
psi	pound-force per square inch	6.89	kilopascals	kPa	kPa	kilopascals	0.145	pound-force per square inch	psi

Technical Advisory Committee

Each research project is overseen by a technical advisory committee (TAC), which is led by an ITD project sponsor and project manager. The Technical Advisory Committee (TAC) is responsible for monitoring project progress, reviewing deliverables, ensuring that study objective are met, and facilitating implementation of research recommendations, as appropriate. ITD's Research Program Manager appreciates the work of the following TAC members in guiding this research study.

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Executive Summary

This focus of this study commissioned by the Idaho Transportation Department Freight Office is on developing freight data that allows for a detailed understanding freight movement within and through the state and an improved understanding of the key freight supply-chains supporting the state's economy. Choices regarding infrastructure improvements are better leveraged with this type of information given limited state transportation budgets and increasing transportation infrastructure needs. This study is unique in the sense that it incorporates vehicle specific transponder data from the private technology firm EROADs, in addition to traditional freight data collection techniques utilizing shipper and establishment questionnaires.

The first chapter provides a synopsis of readily available freight data sources, primarily publicly available sources that can provide various aspects of individual freight supply chains. These include the Freight Analysis Framework (FAF), United States Department of Agriculture (USDA), Idaho Transportation Department, Commercial Vehicle Information Systems (CVISN), Surface Transportation Board, United States Army Corps of Engineers. FAF provides relatively accurate national and state-to-state freight movement data but not the detailed route specific information for freight activity within a state. The USDA has excellent production/processing data for many key agricultural products, particularly those grown in Idaho including potatoes, hay, dairy products, grains and forest products. The STB reports on the weekly performance of all Class I railroads but doesn't provide state level information on rail freight shipments. The Idaho Transportation Department also has traffic count data from all the individual traffic counters throughout the state highway network, but information related to origination and destination and commodity of freight traffic isn't available. Transponder data provides very detailed vehicle trip details, but its typically limited to the population of vehicles carrying the transponder or the service (data) provider's willingness to provide data for research purposes.

To help bridge this freight data gap, this study developed and executed a freight data collection plan that initially leveraged truck trip data from EROADs in order to better understand the richness of such data and to identify which industries and supply-chains would require additional data collection techniques (surveys). This freight data collection plan is provided in Chapter 2.

Chapter three offers the results from the combined data sources (EROADs) and the implemented survey questionnaires to freight shippers. The focus for Chapter three results is on the primary economic sectors in Idaho, but additional information on all types of freight movements from EROADs is also provided in Appendix 3. Generally, the data from EROADs was found to provide very useful route detail and facility origination/destination information for those vehicles utilizing their transponder services. This was primarily for general freight and commercial freight movements. Information for agricultural, natural resource (forest products), mining mineral and other Idaho freight movements were not well represented in the EROADs data, given that these freight movements are typically performed by individual shippers or non-commercial fleet services. As such, freight data questionnaires were developed to selectively collect more industry specific freight information. Overall, the response to these questionnaires was very low, which highlighted a common problem for obtaining industry or

supply-chain specific freight data. The questionnaires utilized in this study were designed to be relatively generic and implementable across several different shipper types. This was primarily due to budget limitations for the data collection phase of this study but generic surveys that don't capture the unique business aspects of each freight supply chain don't normally have high response rates. This in essence characterizes the challenges of obtaining necessary freight data and information at the state level. In order to obtain very detailed, supply-chain specific information such as trip details, routes, highways used, specific origin/destination, etc., a very detailed and costly survey must be conducted within each supply-chain in the state. These data collection efforts are normally cost-prohibitive at the state or local level which is the reason this study attempted to leverage private transponder data. The transponder information provided very detailed information for the small portion of the truck population on Idaho roadways utilizing an EROADs transponder. As more and more freight carriers and shippers install these transponders on freight vehicles, (as required under electronic log devices mandates), this information will become more encompassing across all state industries and supply-chains.

The primary findings resulting from this multi-channel data compilation approach includes the following:

- Agricultural and resource-based freight activities are more geographically diverse and linked to those regions where production activity is concentrated. The characteristics of this type of movement from fields, farms and forests are relatively short distance truck trips to processing facilities that possess wide seasonal fluctuations associated with the production characteristics of the crop produced. Many of these trips originate on roads and highways that are not primary freight corridors and often under the jurisdiction of local cities/counties to maintain. Given that these movements are relatively short distance and seasonally tied to production, information regarding these freight activities can be informed from data related to production and location of processing activities (USDA, Idaho Department of Agriculture). Information related to trip details is not necessarily critical given that the trips are generally to the closest processing facility (grain to grain elevator, potato to cold storage or processing plant, hay to broker, timber to sawmills, etc.) Public investments that facilitate greater efficiencies for this freight activity should focus on maintaining access and capacity (weight limits) connecting these production locations and limiting closures (highway construction) during peak harvest or seasonal freight activity. These improvements will benefit the producers most directly, allowing greater access and efficiency to markets.
- The agricultural and resource-based processing facilities are more concentrated near major transportation corridors (often multi-modal) due to the need to distribute year-round, even as inbound product is seasonal. The outbound/distribution freight activity from these processing facilities is much longer trips to markets far beyond the state borders thus requiring the cost efficiencies associated with rail or barge, in addition to the dependable service attributes of truck. Freight volumes leaving these processing facilities are influenced by a wider array of factors outside the state as these products compete in domestic and international markets. The export component is linked with the ocean ports at Seattle/Tacoma, WA and to a lesser degree the ports

in Oakland, CA whereas the domestic markets are primarily urban centers in the west (Salt Lake City, UT, Seattle, WA, Portland, OR, Denver, CO). Improved efficiencies for the outbound component of agricultural processing facilities can include:

- State incentives and partnerships with Class I railroads in developing inland container terminals that provided better access to ocean ports and shipping containers. This could benefit processed potatoes, hay, high-value grain specifically. The selection of the location is critical in order to generate large enough scale across multiple products to appeal to the Class I railroad interest.
- Aligning of truck weight limits with neighboring states and those connected via these freight supply chains so that processors don't have to load to the lowest state limits through which they travel.
- Manufacturing/warehouse distribution centers are primarily concentrated around Boise/Nampa, Twin Falls and Idaho Falls along I-84, I-15 and I-86 and differ from the freight needs of the agricultural and resource based industries in that large volumes of both inbound/outbound shipments require transportation that is consistent, dependable, resilient and accessible at all times. This is primarily due to the greater importance of timing in warehouse/distribution activities and manufacturing processes that are expensive to start/stop. Given that timing is more critical, maintaining adequate truck parking along this I-84, I-86, I-15 corridor is important for deliveries that must be within narrow windows, particularly for long-haul truck shipments where drivers are more likely to face hours of service limits.
- EROAD data may be evaluated in more granular detail for those high-value, time-sensitive, consistent shipping volume products where enhanced understanding regarding impediments (congestion points) to efficient freight movement is desired. This analysis didn't focus in at that level, but identification of where trip delays are occurring or and determining how to address these transportation inefficiencies is something that EROAD information allows.

Partnering with a technology provider in the future (EROAD or another similar firm) may be an efficient way to obtain the necessary information on specific freight supply chain activities.

Chapter I: Freight Data Inventory

Introduction

The focus of this project was to conduct research on freight and commodity flows through the state of Idaho and to provide detailed analysis for those major supply-chains supporting the state's freight economy. In order to identify and illuminate freight data needs and likewise inform the strategic plan for obtaining additional necessary freight data and information, the section documents information that is currently available. These data are publicly available for most states, particularly those from federal agencies and as shown below, and can be utilized to understand the different characteristics and nuances of freight activity throughout the state. Each data source, while possessing limitations to some degree individually (detailed origin-destination, route, commodity or other data details), when taken and evaluated collectively can be very informative.

Existing Data Sources

The data sources discussed in this report include the following:

- Freight Analysis Framework (FAF)
- United States Department of Agriculture (USDA)
- Idaho Transportation Department (ITD) Automatic Traffic Recording (ATR) and Weigh-in-Motion (WIM) Data
- Commercial Vehicle Information System (CVISN)
- Surface Transportation Board Rail Waybill (public)(rail movements)
- United States Army Corps of Engineers, Waterborne Commerce Data (barge movements)

Freight Analysis Framework

The Bureau of Transportation Statistics, in partnership with the Federal Highway Administration (FHWA), produces the Freight Analysis Framework (FAF). FAF integrates data collected from several different sources to create a comprehensive pattern of freight movements between states and major metropolitan areas, considering all modes of transportation. FAF utilizes information from various sources, including the 2012 Commodity Flow Survey and international trade data from the Census Bureau on different industry sectors (e.g., agriculture, extraction, construction, utility, service, etc.). The baseline and most current edition available is FAF version 4 (FAF4) that provides a database of shipment tonnage and value by region or by state of origin and destination, commodity type, and mode¹. Detailed information regarding freight movements originating and ending within a particular state can be obtained, including both the value (in \$M) and volume (in tons) by commodity type. The following figures (Figures 1-4) illustrate shipments leaving and arriving into Idaho from other states. Each figure

¹ Data can be downloaded from: [Federal Highway Administration Freight Analysis Framework \(FAF\) Website](#)

provides the commodity distribution and the state that shipments originated or ended in by both volume and value. This type of information is useful for identifying both economic and geographical connections across different states and the types of industries generating freight activity.

It is evident from the FAF data that a large majority of freight shipments into and out of Idaho are concentrated in those neighboring states, particularly Utah and Montana. One important observation from comparing the FAF maps below is how much freight is contained (both generated and destined) within Idaho, compared to that which leaves the state or originates in other states. This is attributed to the large agricultural and forest products industries located in the state and the freight characteristics associated with moving product from production to processing within the state border. However, the maps also illustrate that businesses in Idaho depend upon freight movements coming into the state from as far away as Georgia and Texas (by tons) and Florida and Virginia (by value). Those states connected to Idaho via I-80/I-84 (Wyoming, Nebraska, Iowa, Illinois) are important for freight arriving into the state as illustrated by the red intensity in both value and tonnage on the maps below (Figures 1 and 2). That corridor and those particular states are less important for freight leaving the state.

Differentiating between volume and value for inbound freight shipments can also help reveal unique characteristics. The connectivity and importance of Utah and Montana is the same for both value and tonnage for inbound freight volumes. This reveals a broader array of freight coming from these states, including both high value and low value bulk items. Also, freight shipments arriving from Wyoming, Nebraska and Iowa are more volume intensive and lower value as opposed to those arriving from Illinois and California that are more value based. It is also evident that agricultural and natural resource-based commodities dominate the largest volume of inbound freight shipments, given the distribution of commodities in the tonnage commodity bar chart whereas those shipments with the highest value are mixed freight, foodstuffs, motor vehicles and electronics. The primary commodities for outbound freight shipments by tonnage from Idaho are very similar to those commodities arriving into the state, including agricultural products, cereal grains, wood product and coal. The largest category for outbound shipments by value is other foodstuffs (processed dairy products and processed potatoes). There is also a slightly different geographical connection for Idaho freight destinations; whereas Nebraska and Wyoming generate large volumes of inbound Idaho freight by both tonnage and value, these states are considerably less dominant for outbound shipments. Outbound freight shipments from Idaho are more concentrated in Colorado, Missouri, Illinois and Texas for eastern shipments and the other Pacific Northwest states (Washington, Montana, Oregon) and California for westbound movements.

One benefit of FAF is the fact that it is publicly available and does provide relatively detailed freight movements from state to state across different freight modes. It also helps characterize the underlying business and industrial makeup of the state by providing detailed commodity information on inbound and outbound shipments by both tonnage and value. One drawback is that the information is often quite dated given that much of the information populating FAF originates from either the commodity flow survey or the U.S. census. As a result, it may not capture the dynamic nature of changes in freight activity on a more seasonal and real-time basis, and by the time the most recent version is released the

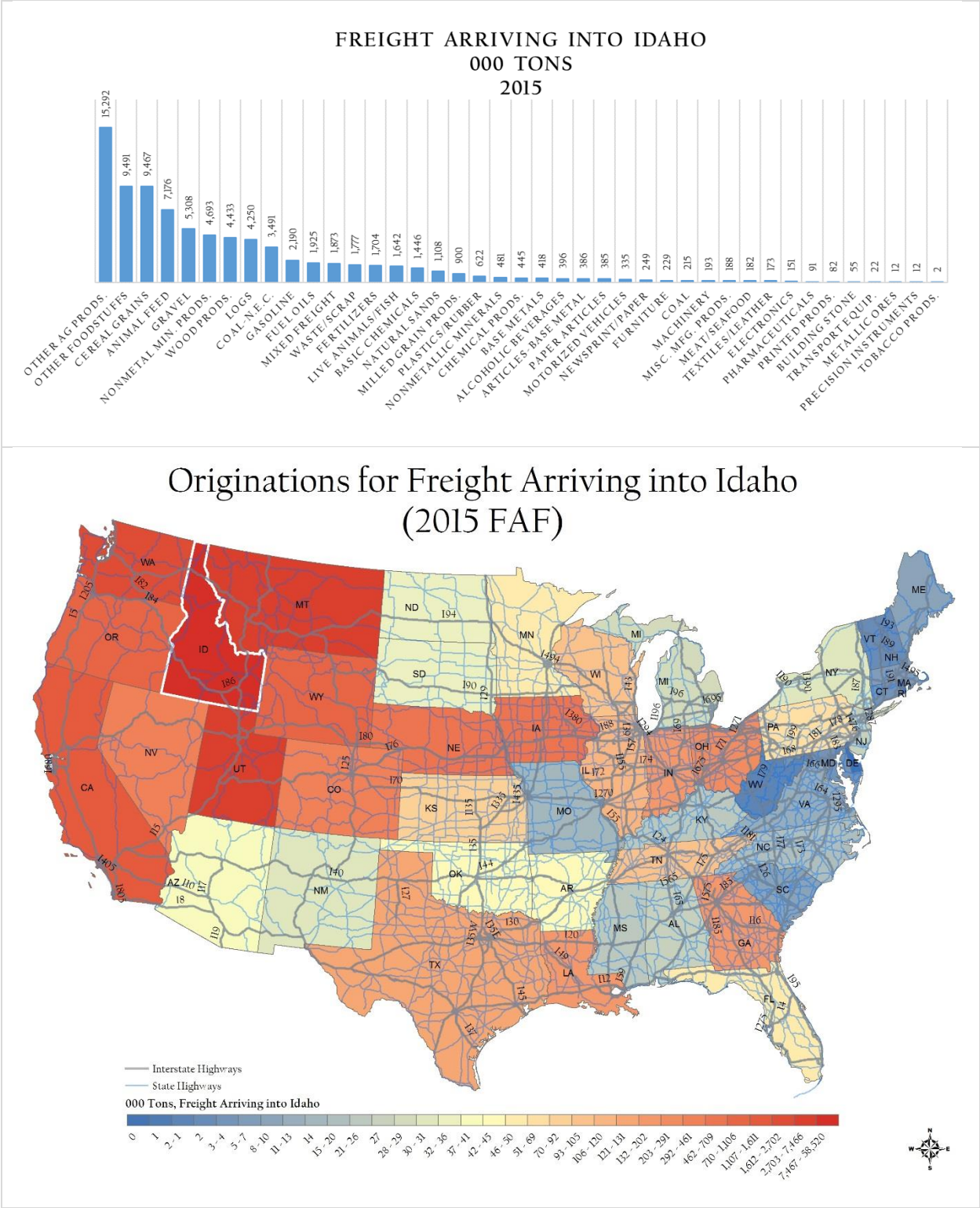


Figure 1. Freight Arriving Into Idaho, by Originating State and Commodity, Tons, 2015

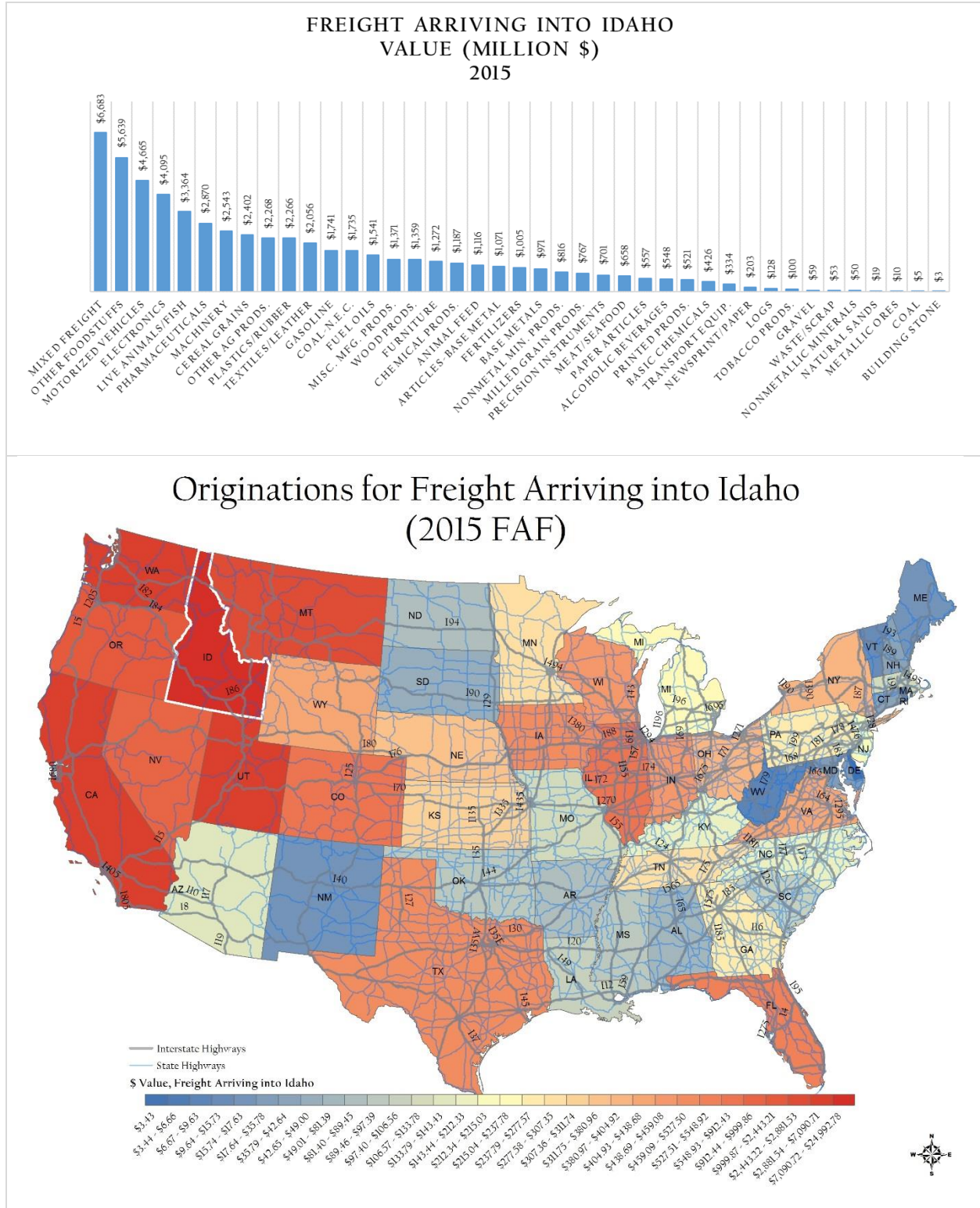


Figure 2. Freight Arriving Into Idaho, by Originating State and Commodity, Value, 2015

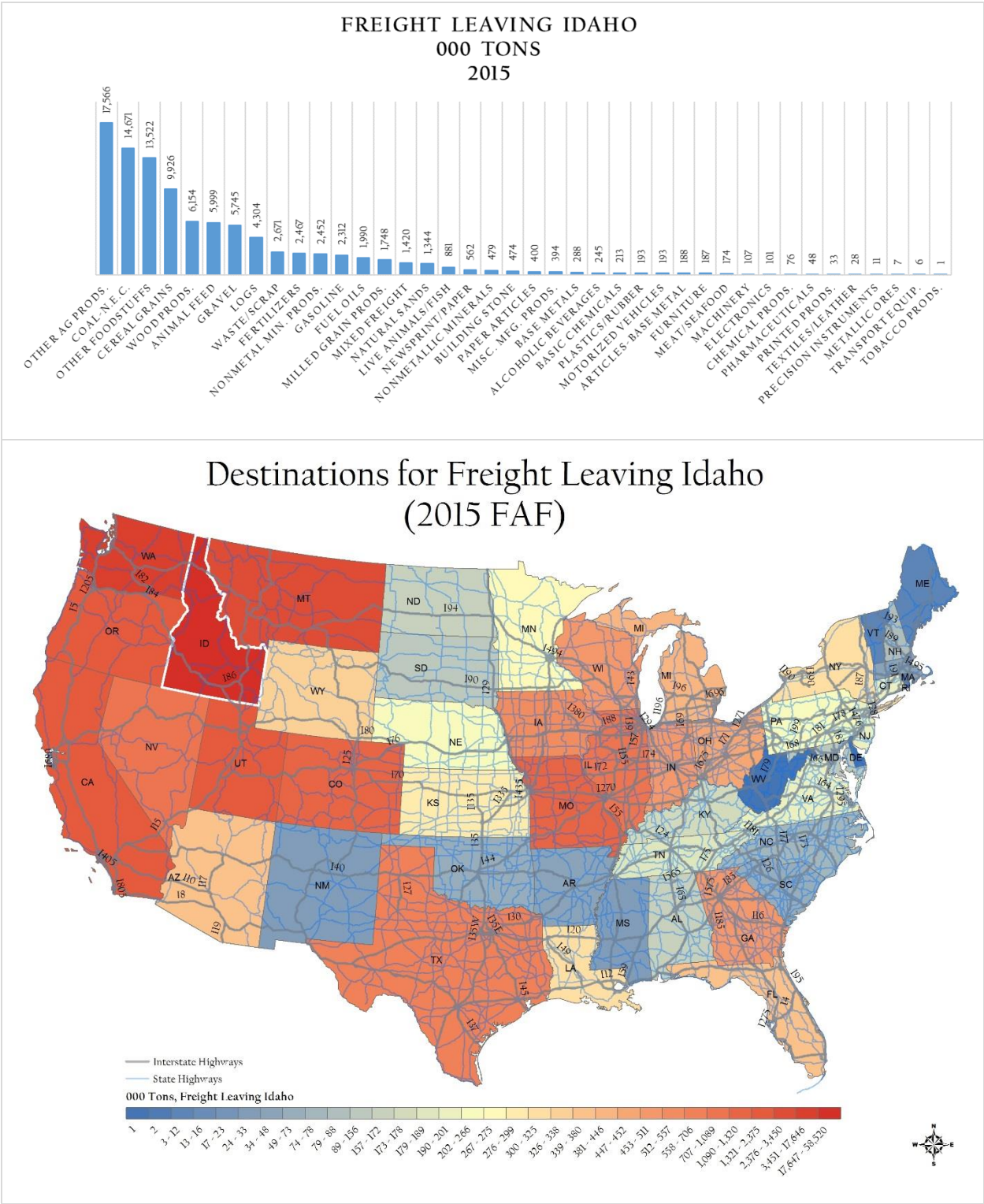
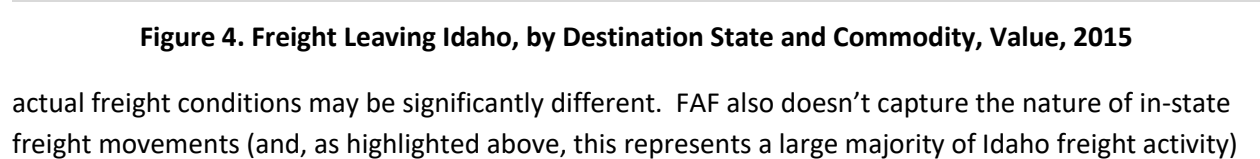


Figure 3. Freight Leaving Idaho, by Destination State and Commodity, Tons, 2015



or information on secondary freight activity, such as intermediate stops or empty truck trips. There is also no information regarding freight routing or trip-chain details.¹

United States Department of Agriculture

The USDA can also be a valuable source for supplementing individual state freight and commodity flow information, particularly given the level of agricultural and natural resource-based industries that are concentrated within Idaho and the significant contribution these industries make towards the state's economy. The USDA provides county level production data for all crops and agricultural commodities on an annual basis that can be mapped in order to identify those specific geographies within the state that generate different types of agriculture production and freight shipment activities. Examples of this USDA data are provided in Figure 5 below, detailing hay, potato, wheat and dairy production for the state. These agricultural products represent a large proportion of Idaho agricultural production and therefore constitute a significant component of the state's freight activity in moving these products from field to processing/distribution centers (heavy, lower valued freight) and final markets (higher valued, processed goods). In each map below (Figure 5), the intensity of production is easily identified, and the southern half of the state comprises the heaviest agricultural production. Hay production, while spanning most counties from the southwestern to southeastern border, is primarily concentrated between Twin Falls and the Oregon border to the west. This is not coincidentally the same area of concentration for dairy cows and milk production in the state, given that a large proportion of hay production supports the large dairies. Potato production is more heavily concentrated in the southeastern corner, between Twin Falls and Rexburg and, while not displayed on the map, is also where many cold storage and potato processing plants are located. Grain production is concentrated in both the southern and northern portions of the state, primarily wheat and barley production as illustrated in Figure 5. The grain elevator locations are also displayed on this map, which represent the destinations from the farms for most grain shipments. In the north, near Lewiston and Grangeville, grain is often shipped via truck to the Snake River ports in Lewiston to utilize cost-effective barge shipment to export terminal on the Lower Columbia River near Portland, OR. In the south, grain shipped from elevators primarily utilizes rail in order to access Pacific Northwest grain export ports in Seattle and Tacoma, WA and Portland, OR.

The USDA has data on the volume capacity and locations of grain elevators, nationally. The USDA Agricultural Marketing Service (AMS) also provides reports and data sets related to, grain transportation, port deliveries, and non-grain products. However, many data are presented for the Pacific Northwest Region, which aggregates Idaho, Oregon and Washington.²

There are many different agencies within USDA that also have information on the locations of other agricultural and processing facilities that can aid in the determination of the origins of freight movements and major agricultural commodities produced in the state, such as:

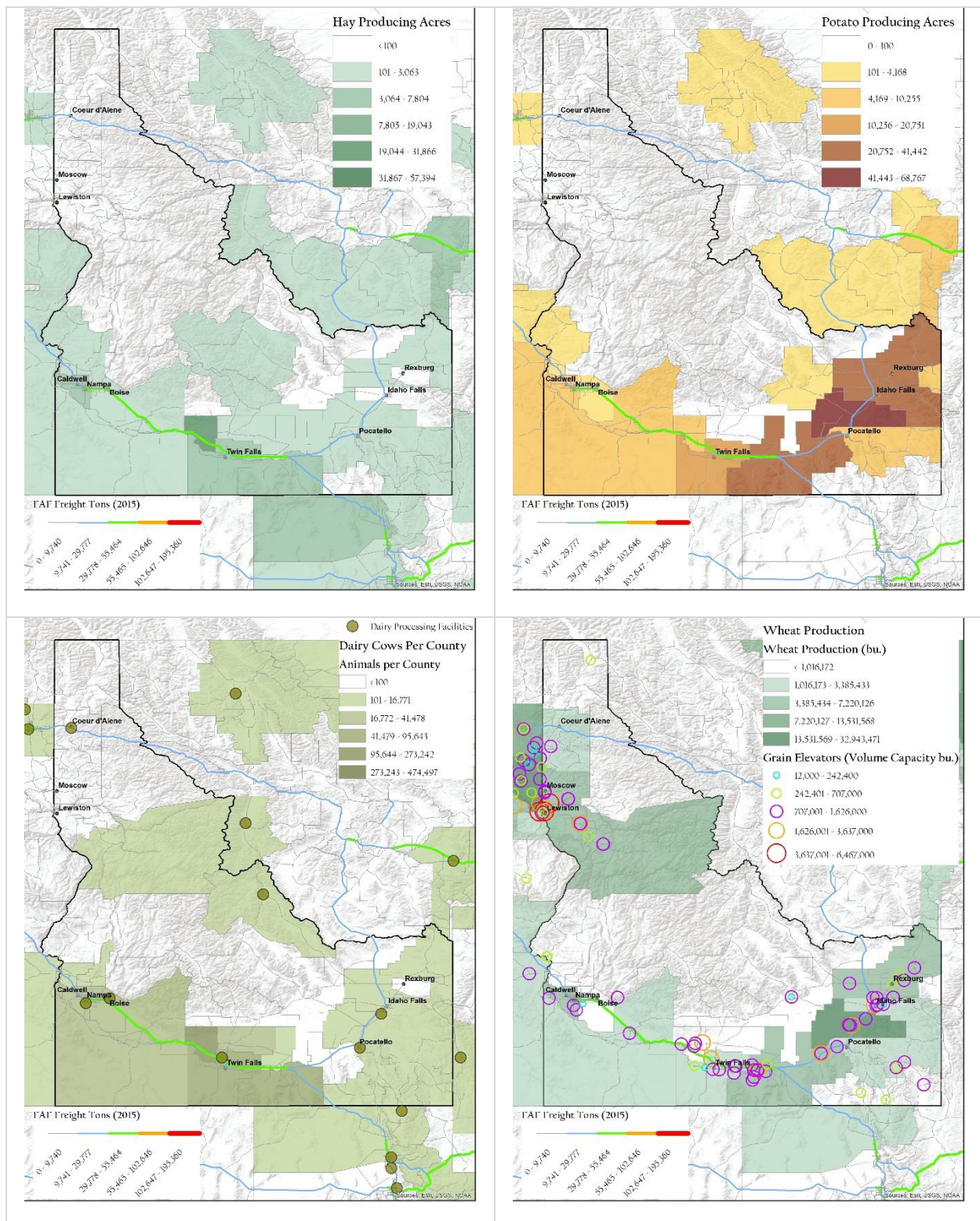


Figure 5. Idaho Agricultural Production, by County, Hay, Potatoes, Dairy and Wheat, 2016

- National Agricultural Statistics Service (NASS), which maintains a contact list of commercial and public warehouse from 48 states that store refrigerated products for 30 days or more, and a database about attributes of different agricultural products such as acreage, yield, production, prices, etc.^{3,4}
- Farm Service Agency (FSA), which compiled a list of warehouses in the U.S. including grain elevators in Idaho.⁵

Idaho Automatic Traffic Recorders / Weigh-in-motion Data

The state of Idaho also compiles data collected from automatic traffic recording devices and weigh-in-motion sensors located in highways throughout the state. The places where traffic recording devices are located are continuously collecting traffic counts and provide very useful information related to changes in traffic activity over time, at specific locations and across different vehicle classifications. This information is used for a variety of purposes, including satisfying reporting requirements associated with the Highway Pavement Management System (HPMS) to FHWA. The obvious limitations associated with this data are the lack of information related to shipment origin, destination, commodity or route traveled. However, by evaluating the data collectively across all locations throughout the state or for specific corridors, significant insights can be obtained regarding freight characteristics.

The following figures (Figures 6 – 9) illustrate some useful information related to freight movements throughout the state of Idaho utilizing the ATR data at all sites within the state for 2016. There are three different vehicle classifications for freight vehicles, including straight trucks (Straight Truck), tractor with one trailer (Tractor Trailer) and tractor with two trailers (Truck 2 Trailers). Two different bar charts are displayed in Figure 6, illustrating the average truck counts by day of week and month per year, which illustrate some interesting trends. Straight trucks exhibit significantly more variation between weekend and weekday activity but very little variation in volumes across different weekdays. This is likely attributed to the fact that straight trucks are utilized for delivery which is influenced by regular working hours on weekdays and are consistent throughout the week. Tractor trailers and tractors with two trailers exhibit similar patterns, but less pronounced. The tractors with two trailers have the most weekday variation, particularly between Monday and Tuesday and between Thursday and Friday. There are also differences in seasonal patterns across months, by vehicle type. The straight trucks exhibit the least month to month or seasonal variation, they generally maintain consistent volumes per month throughout the year. Both the truck with trailer and truck with two trailer vehicles exhibit peak patterns during the summer and fall months, with the truck and two trailer vehicles having the most pronounced peak between July and October. This is most likely attributed to the seasonal nature of agricultural production and the utilization of these vehicle types in moving agricultural products.

There are also figures below which identify the geographical concentration of average truck counts by vehicle type (Figure 7), the degree of weekday variation by vehicle type for the state (Figure 8), and the monthly variation by vehicle type (Figure 9). It is apparent that the highest concentration of straight truck traffic is around the urban regions, but not for the longer distance type tractor trailer and tractor

with two trailers. The larger vehicle types are evenly distributed across the southern and northern Interstate system, and less in between. The values exhibited in Figures 8 and 9 represent a percentage, calculated as the range (difference between the highest and lowest average day) divided by the overall weekly average for day of week variation. This allows comparisons in variability across the three different vehicle types and geographies, for those vehicles and areas with the greatest weekday or monthly variation. Evaluating the variation by truck type in conjunction with density of truck traffic is manifest from the products and commodities being moved. For example, straight trucks are primarily concentrated around urban areas and weekday variation is greatest in these areas, but there is still significant weekday variation with these vehicles in rural areas even though the truck counts there are relatively low. Tractor trailers and trucks with two trailers are predominately concentrated along the interstates and, except near urban areas, show very little weekday or monthly variation around the interstates compared to the rural and agricultural regions. This is due to the seasonal nature of agricultural production.

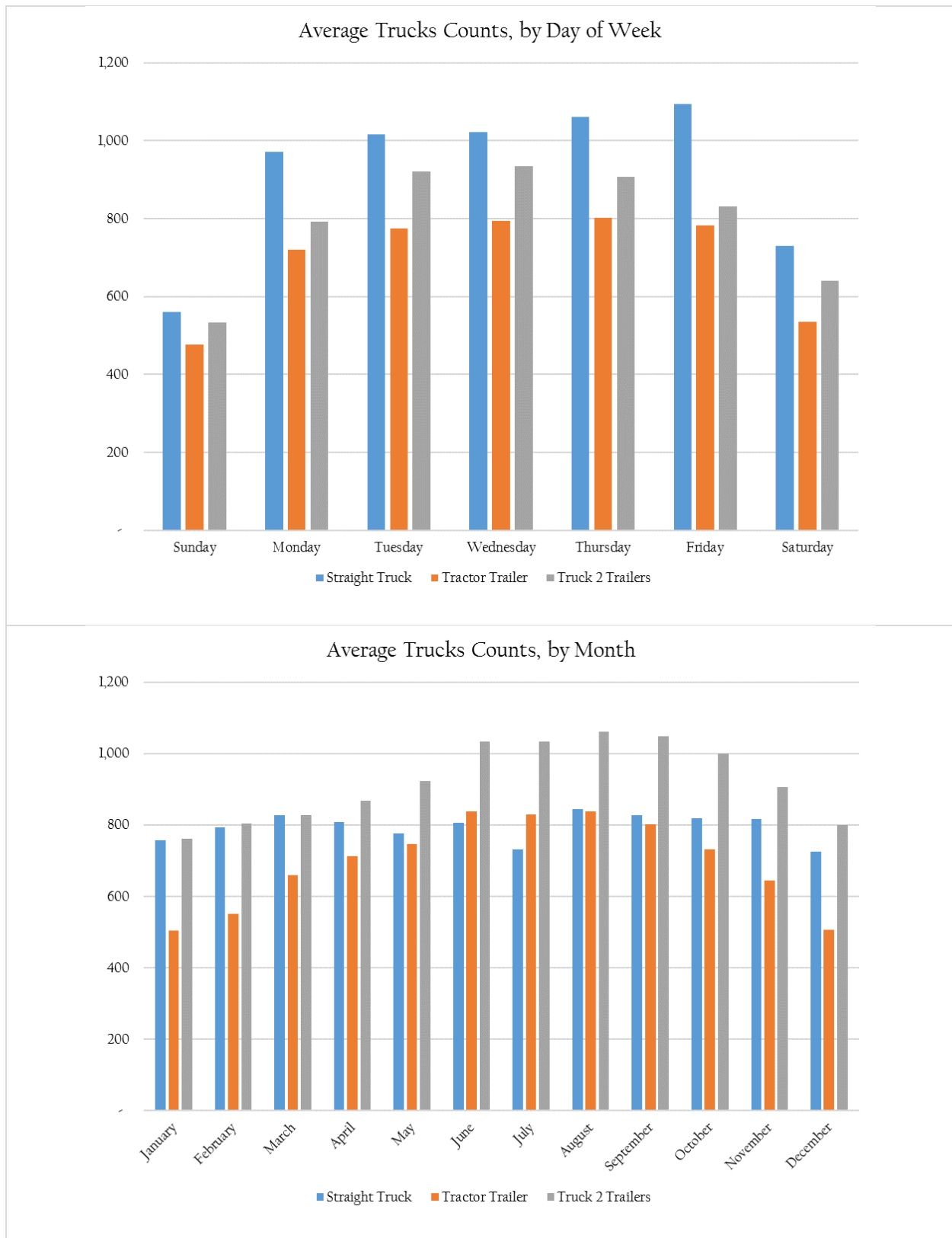


Figure 6. Average Truck Counts at All ATR Locations, by Day of Week and Month, 2016

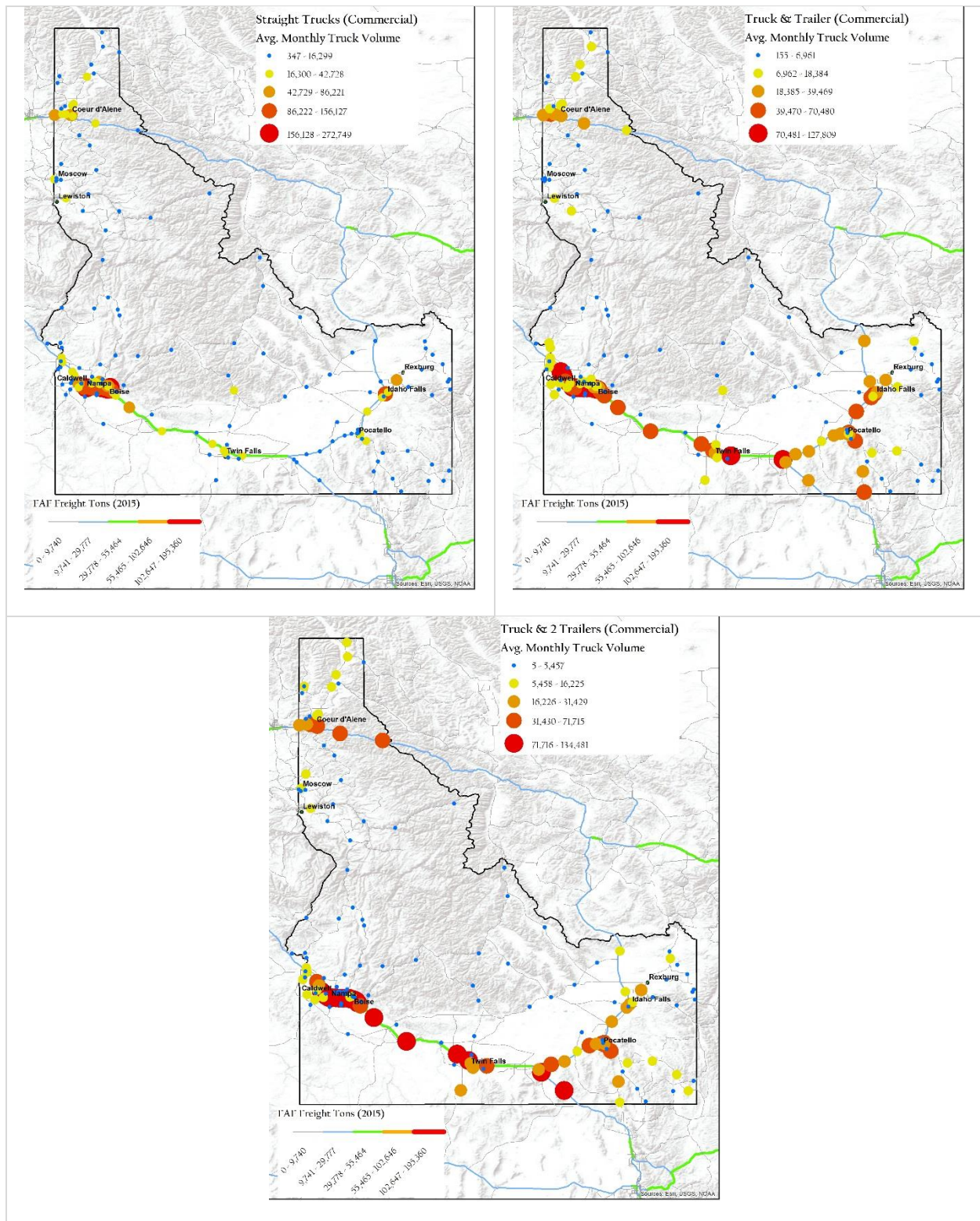


Figure 7. Average Truck Counts at All ATR Locations, by Day of Week and Month, 2016

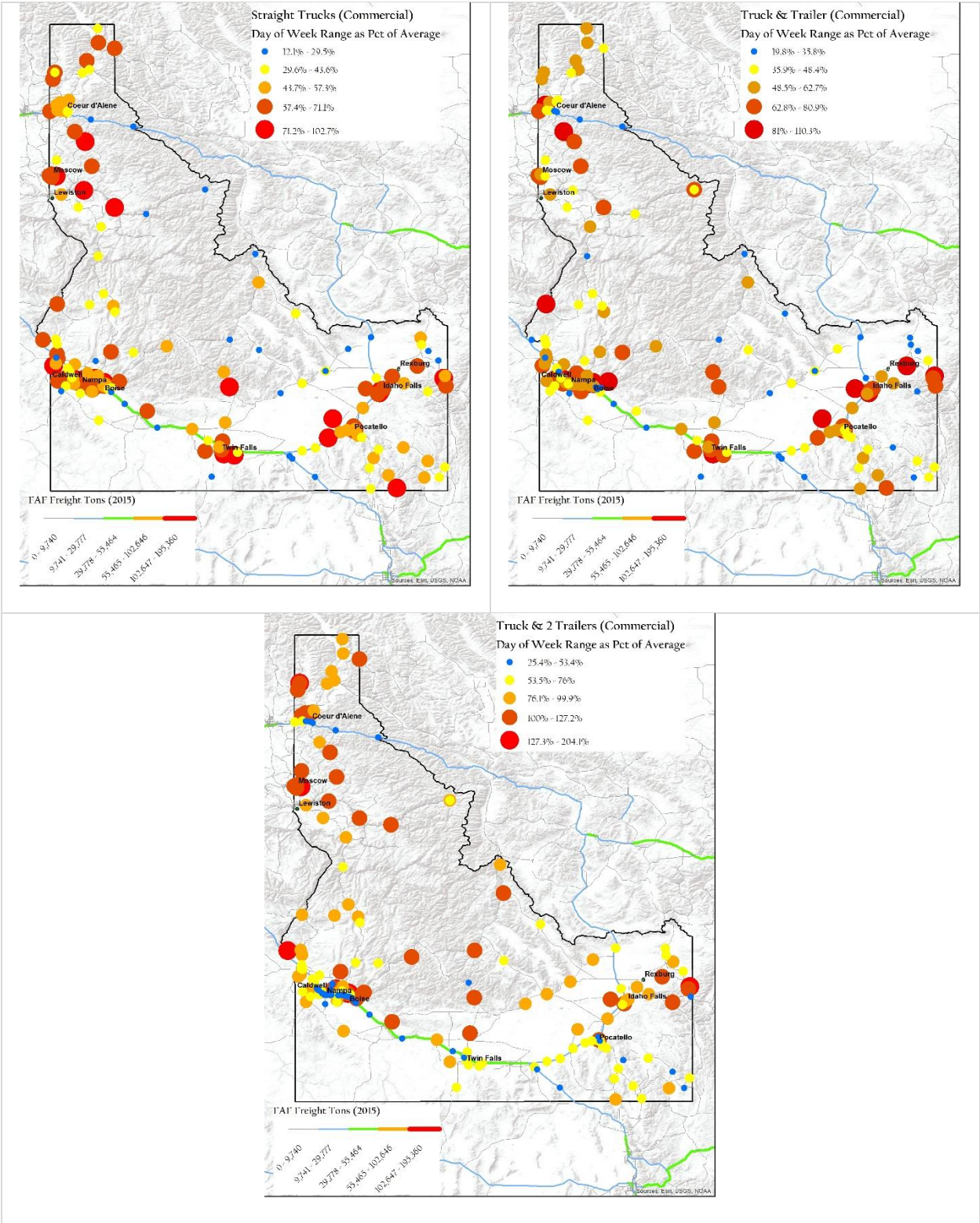


Figure 8. Day of Week Variation at All ATR Locations, by Truck Type, 2016

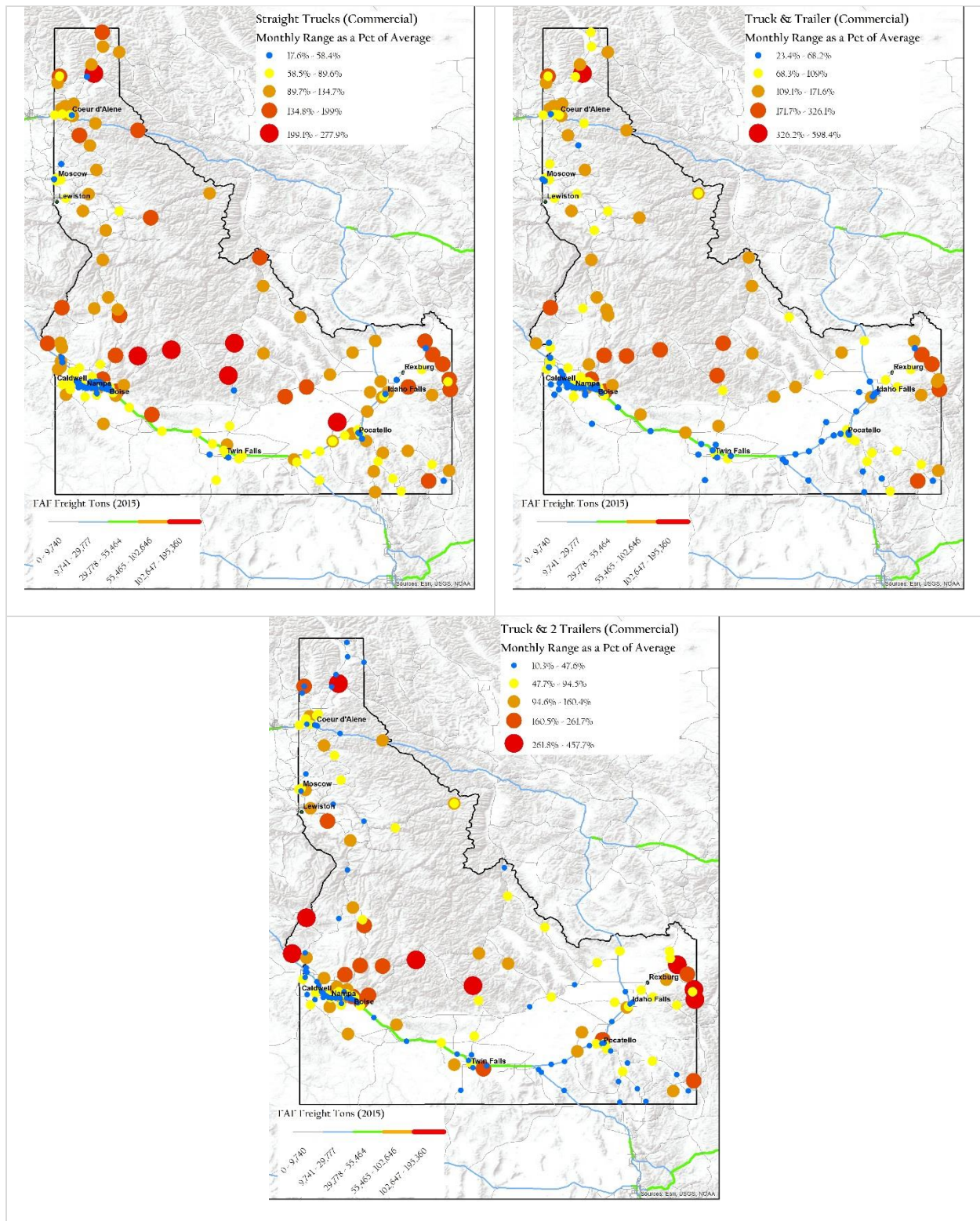


Figure 9. Month Variation at All ATR Locations, by Truck Type, 2016

The advantages of automatic traffic counters are:

- Data can be collected without traffic disruption.
- Truck counts can be obtained from different locations in the state with low labor requirement.
- Traffic frequencies by vehicle type for specific locations can be obtained.

The disadvantages include:

- Potential for equipment failure.
- No information provided about the origin and destination of trips, type of commodity shipped, routes, etc.
- Data collection is limited to highway segments that have traffic counters.

However, this data source allows the identification of truck corridors which may be beneficial for identifying potential locations of roadside surveys.⁶

Commercial Vehicle Information Systems Network

Most states have a commercial vehicle enforcement division that is part of the state patrol or a parallel entity focused on enforcing regulations around commercial vehicles operating within and through the state. Some of these states (like Idaho, Washington and Oregon) also implement the Commercial Vehicle Information Systems and Networks program (CVISN), which is an integrated network of information systems and communications network at the local, state and national levels.⁷ The Idaho CVISN includes port of entry booths in two locations where trucks can register when they first enter the state ports of entry, East Boise and Lewiston (see red markers in Figure 6). The monitoring system aims to detect, weigh, classify and aid enforcement of commercial vehicles, such as WIM and CVISN.⁸ The core function of CVISN is to implement electronic screening at the inspection site where enrolled vehicles are identified and screened based on safety history, credentials (e.g., registration and fuel tax payment), and weight and are allowed to enter if the state's criteria to bypass inspection sites are met.⁹ This data source enables collection of data on vehicle types that pass through the ports of entry, but no information can be obtained on origin and destination, shipping routes, type of commodity shipped, etc.

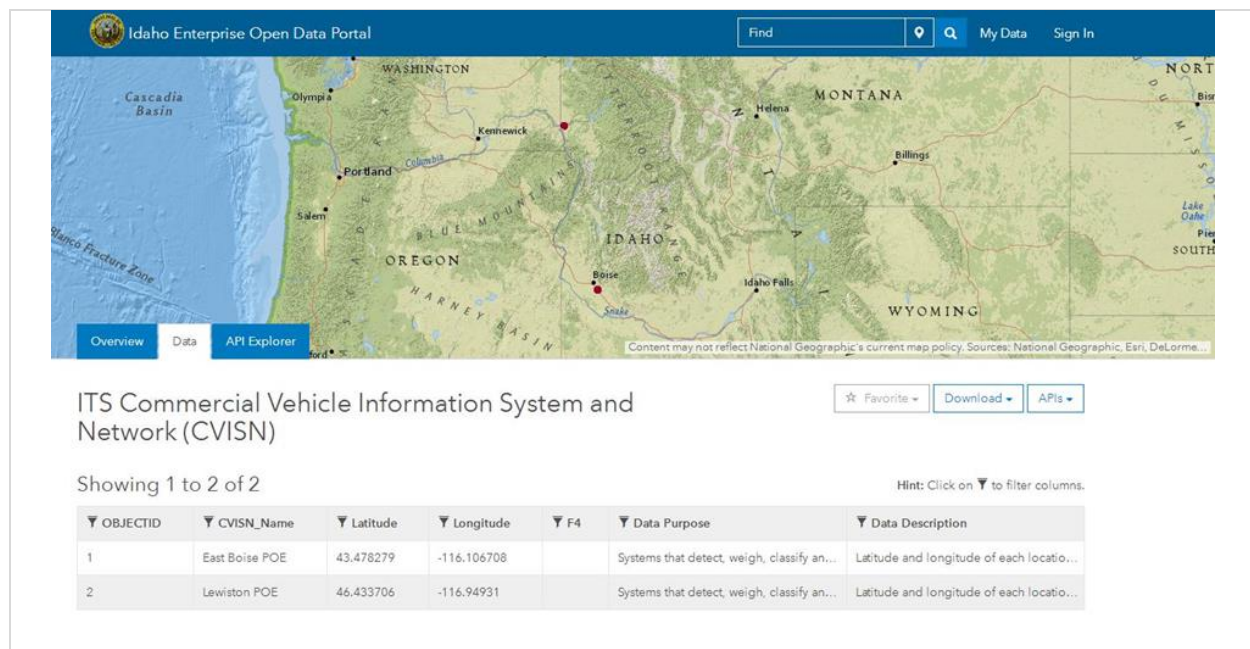


Figure 10. ITS, CVISN Locations in the State of Idaho, 2017

Surface Transportation Board Rail Waybill

The Surface Transportation Board (STB) maintains a database which contains the national coverage of rail shipment information, the source of which is an annual stratified sample of waybills for railroads that terminate 4,500 or more cars per year. Data are submitted by freight railroads to the STB. Data availability is in two forms: the Carload Waybill Sample, a confidential database, and the Public Use Waybill Sample, a publicly available, aggregated database.¹⁰ While the Carload Waybill Sample is restricted, access can be granted in instances when it is the only source of data and/or when obtaining data from other sources is expensive or otherwise burdensome. The Public Use Waybill Sample is created from the confidential Carload Waybill Sample file.

The advantages of the Rail Waybill sample are accessible data on

- origin and destination,
- types of commodity,
- car count
- weight
- revenue,
- length of haul,
- participating railroads
- interchange locations

The main disadvantage is that the Waybill Sample is restricted access due to sensitive information about shipping and revenues. Access can be requested from STB, but the requesting party must follow certain requirements and protocols. However, an aggregated publicly available version containing non-confidential information is available.

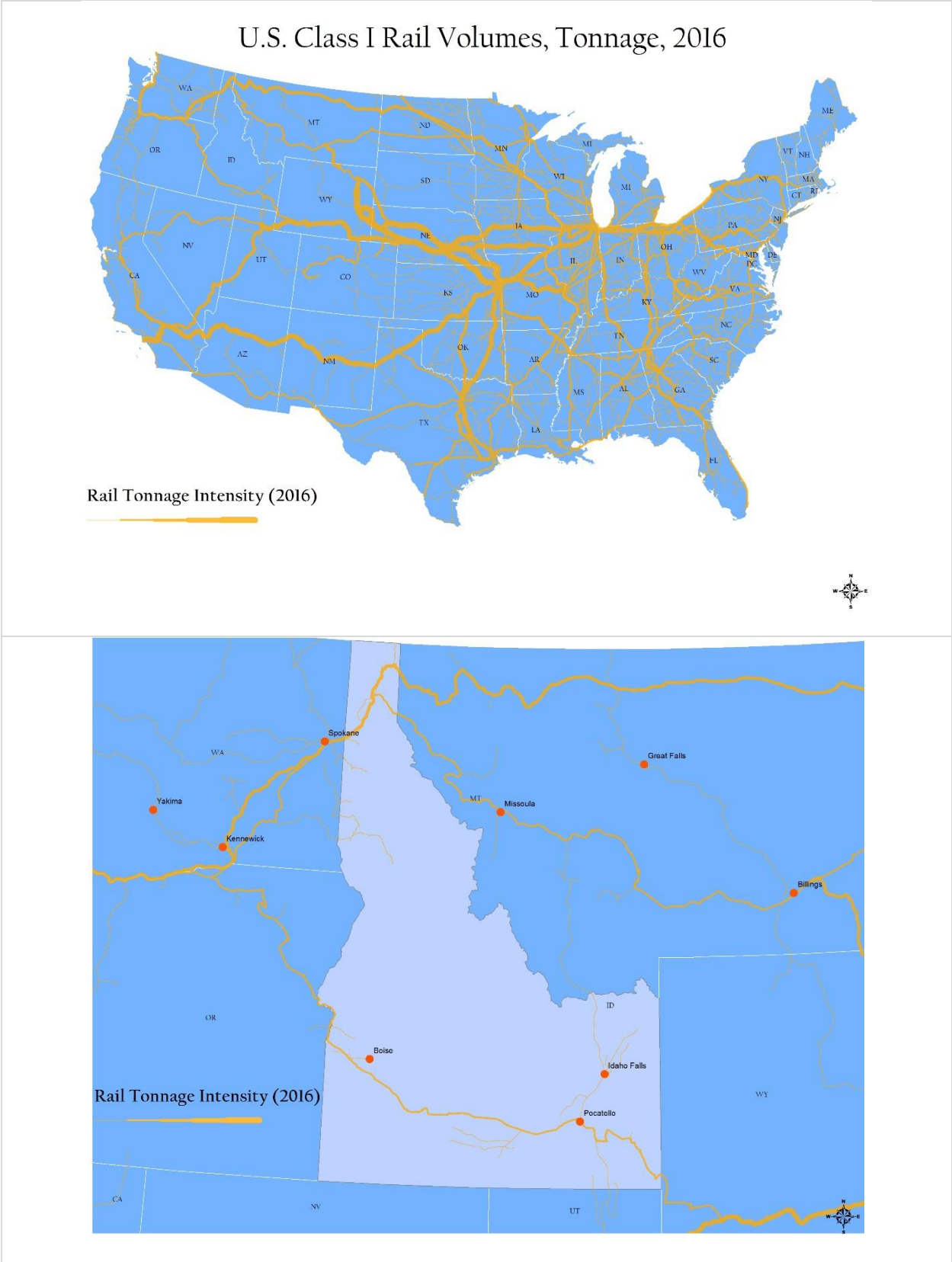


Figure 11. Class I Rail Volumes, 2016

U.S. Army Corps of Engineers, Waterborne Commerce Data

Water shipments by barges can be obtained from the U.S. Army Corps of Engineers (USACE) Waterborne Commerce Statistics Center (WCSC). The WCSC collects and provides data on cargo and vessel trips that take place in the navigational channels of the U.S. to the public. Under federal law, vessel operating companies must report domestic waterborne commercial movements to the USACE. The vessel types include dry cargo ships and tankers, barge (loaded and empty), fishing vessels, towboats, tugboats, crew boats and supply boats to offshore locations, newly constructed vessels from the shipyard to delivery point, and vessels remaining idle during the reporting period.¹¹ Vessel characteristics, documentation and ownership data can be accessed (with limitations) through the US Coast Guard Vessel Database.¹² Public domain databases contain state-to-state and region-to-region commodity movements in tonnages by type of commodity, origin, and destination. Data are updated annually and span from 2001-2016.^{13,14}

Data are presented for 14 major commodity types:

- coal, lignite and coal coke
- crude petroleum
- petroleum products
- chemical fertilizers
- chemicals excluding fertilizers lumber, logs, wood chips and pulp
- sand, gravel, shells, clay, salt and slag
- iron ore, iron, and steel waste and scrap
- non-ferrous ores and scrap
- primary non-metal products; primary metal products
- food and food products
- manufactured goods
- unknown and not elsewhere classified (NEC) products

Figures 12 and 13 show the state-to-state movements of a commodity by tonnage, specifically where Idaho is the origin state and destination state, respectively. Data are available for only 3 commodity types originating from Idaho and 2 commodity types going to Idaho. The main drawback of using the WCSC data is the inability to get information about specific commodities. For example, a significant volume of unknown and NEC products is shipped from Idaho, so it would be helpful if there were a breakdown of specific commodities that fall into this category.

For region-to-region commodity movements, there are 15 regions; Alaska, Hawaii and Pacific Territory, Caribbean, Canada, Rest of World (foreign ports), Trans-shipment Area (ports and offshore anchorages), and Other - open water such as fishing areas, oil rigs), and the rest of the regions are classified by major rivers (e.g., Upper Mississippi, Lower Mississippi, Columbia/Snake/Willamette), lakes (e.g., Great Lakes), and coastal states (e.g., Gulf Coast-East and West, Atlantic Coast-North, South, Middle, Washington/Oregon). If looking at regional data, however, water shipments from/to Idaho are aggregated within Washington and Oregon.

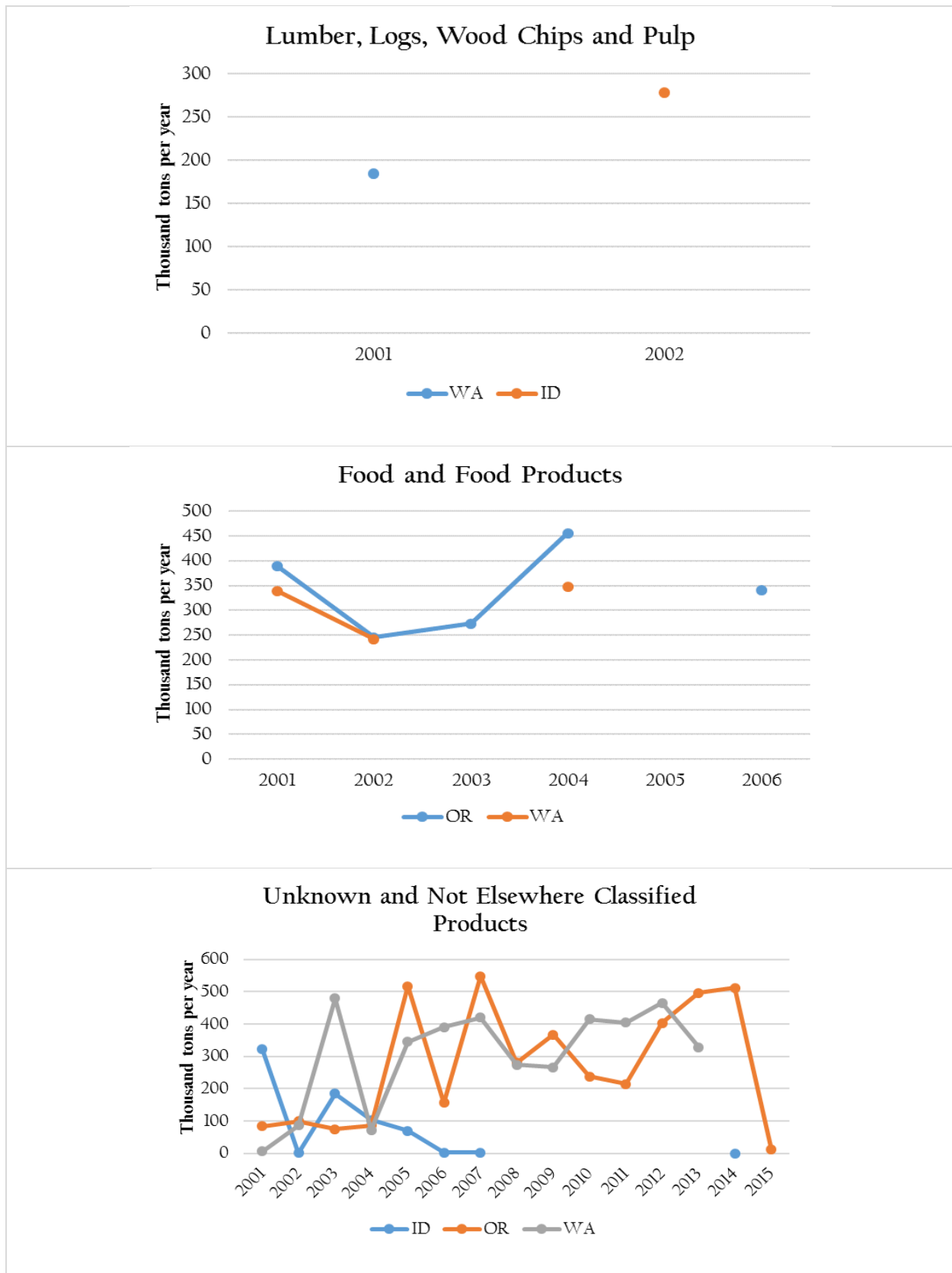


Figure 12. Waterborne Commodity Movements from Idaho to other States, by Tonnage .

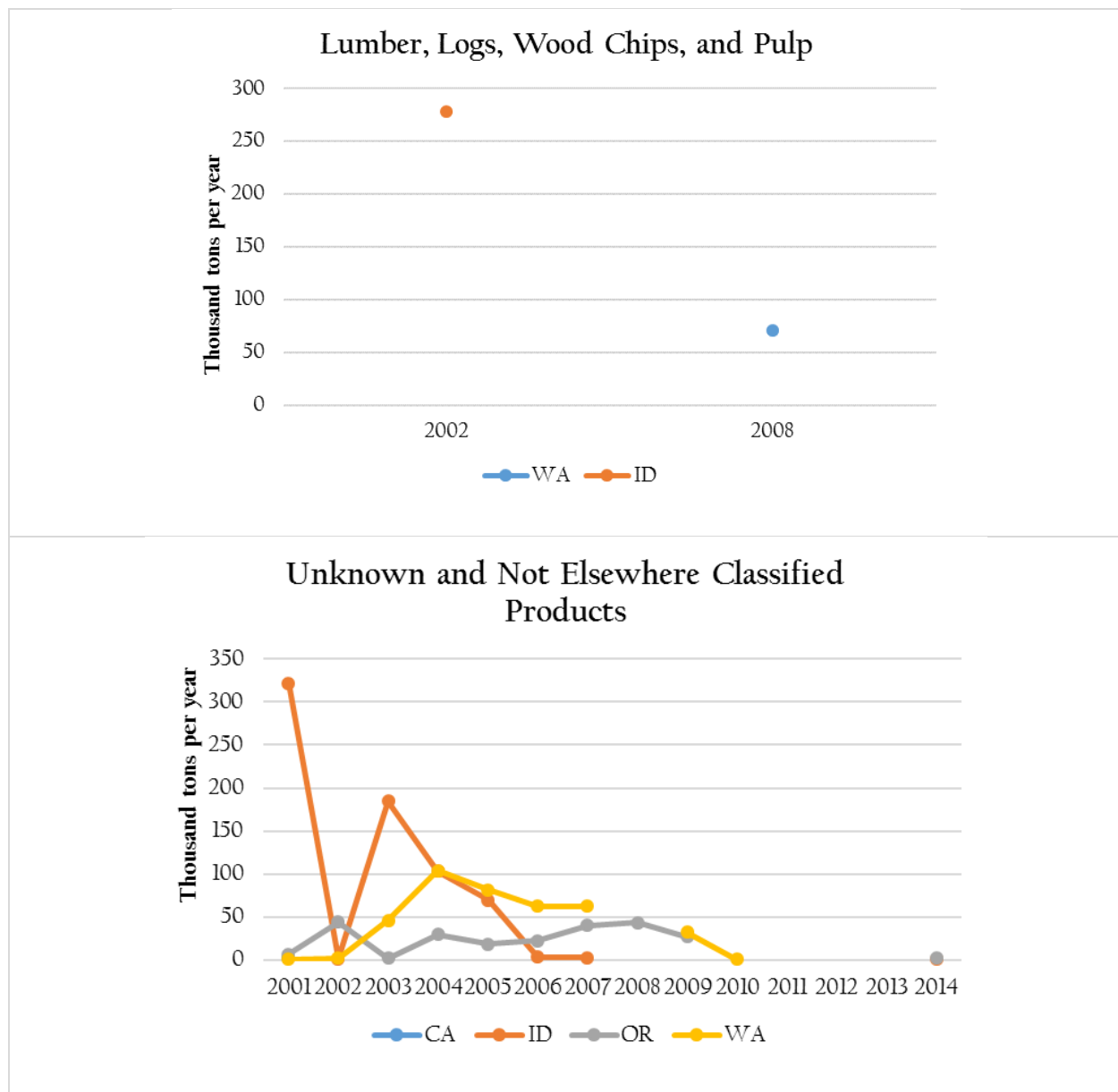


Figure 13. Waterborne Commodity Movements from other States to Idaho, by Tonnage.

Summary of Available Freight Data

This section summarizes the strengths and drawbacks of the different sources of publicly available data on freight movements by truck, rail, or water. FAF4 provides detailed data of state-to-state freight movements by different modes, particularly origin and destination of trips and type of commodities shipped. However, freight data are often dated since they are based in the U.S. Census or commodity flow survey that are not updated annually. Furthermore, data on freight movements within the state, secondary freight activities, or trip-chain details are not captured in the FAF4 database. The FAF4 data does provide useful data on intra-state freight movements, as highlighted above for freight movements into and out of Idaho.

Table 1: Types of Data Available from Public Sources

	FAF4	USDA	Traffic Counters	Port of Entry	Rail Waybill	USACE WCSC
Origin of vehicle trips	○	●	●	●	○	○
Destination of vehicle trips	○	●	●	●	○	○
Vehicle classification	○	●	○	○	●	○
Type of commodity carried	○	●	●	●	○	○
State-to-state freight data	○	●	●	●	○	○
In-state freight data	●	●	○	●	●	●
Intermediate stops	●	●	●	●	●	●
Locations of grain elevators and warehouses	●	○	●	●	●	●
Attributes of agricultural products (acreage, volume of production)	●	○	●	●	●	●
Vehicle/rail car count data	●	●	○	●	○	●
Vehicle/rail car weight data	●	●	●	○	○	●
Revenue of carloads (rail only)	●	●	●	●	○	●
Length of haul (rail only)	●	●	●	●	○	●
Participating railroads (rail only)	●	●	●	●	○	●
Interchange locations (rail only)	●	●	●	●	○	●

Notes: FAF4 - Freight Analysis Framework Version 4; USDA – U.S. Department of Agriculture databases; Traffic counters – includes Automatic Traffic Recorder and Weigh-in-Motion; USACE WCSC - U.S. Army Corps of Engineers Waterborne Commerce Statistics Center. ○ means data are available; ● means data are not collected by the source.

Table 1 presents a side-by-side comparison of the types of data that are available from the different sources described below. This illustrates that while no individual data source can provide all freight-related data in the state, it can be used in tandem with other data sources.

USDA does not provide detailed freight movement information like other existing data sources, but it is a valuable source of agricultural and natural resource-based industries that can be mapped to identify the locations in the state where productions of these industries and related freight movements are concentrated.

Data from *traffic recorders/weigh-in-motion* devices help to identify geographic concentrations of truck traffic in the state. Information can be further classified by vehicle type and different time periods. However, this source does not provide information on the origin and destination of trips, type of commodity shipped, routes, etc. Also, data are limited to highway segments where traffic counter devices are used.

Through the CVISN, data on the classification and weight of vehicles that enter the *Port of Entry* can be obtained. Other details like origin and destination, and type of commodity shipped are not collected at the port of entry.

The *Rail Waybill* sample provides data on rail car count and weight data, types of commodity, revenue of carloads, length of haul and participating railroads, but data are restricted for public access due to confidentiality issues. Waybill sample for public use is available where data are aggregated to show state-to-state rail movements by commodity classification.

The public domain databases of the *USACE WCSC* provide information for state-to-state and region-to-region waterborne commodity movements. Data are presented in tonnages by type of commodity, origin and destination. Commodities are grouped into general classifications to protect the confidentiality of individual companies providing the data. This becomes an obstacle when trying to evaluate movements of specific commodities.

Avenues for Supplementing Freight Data

Primary data collection can be an alternative or supplement to secondary data that are currently available and described above. Primary data collection approaches include GPS vehicle routes that can be obtained from private data sources, surveys or questionnaires, (such as establishment, shipper/trucker and roadside surveys), and video streaming/image capture. This section will describe each approach including implementation, investment and maintenance requirements, data quality, geographic coverage, commodity identification, and seasonality.^{6,15}

GPS Vehicle Transponder Data

Through a technology provider, a freight company can attach electronic logging/tracking devices or Global Positioning System (GPS) receivers on trucks to manage their vehicle fleet. Using GPS equipment is a high-tech means to gather data on vehicle route information, vehicle speed, trip distance, travel time,

start/stop/idle time periods, and truck type frequencies on given corridors. Examples of technology providers are:

- **INRIX**
 - INRIX collects data on vehicle counts and real-time traffic speed. The three data sources are automotive manufacturers, mobile phones, and truck fleets equipped with GPS receivers. An INRIX trip records with waypoints includes travel route data related to the start, end, and waypoints of a particular type of vehicle within a user-defined region. These data are useful for looking at trips patterns with routing and detailed speed and travel time profiles, assessing system changes over time, and linking demographic information with associated trips.
- **EROAD**
 - EROAD provides an in-vehicle electronic logging device (ELD) that can be used by drivers and fleet managers to monitor the drivers' hours of service. Drivers can log daily and weekly reports, as well as reports of on-duty status, rests, and resets. All data are transmitted to a secure web portal from which managers receive real-time notifications and access driver records. More information about this technology provider can be found in the [EROAD Website](#).

The drawbacks of using GPS receivers for data collection are high equipment costs, equipment malfunctions and other technical difficulties, and lack of information on trip purpose, commodity shipped, and trip chaining. Also, not all freight companies within the area of study may utilize GPS receivers on any or all of their trucks, thus limiting the data collected. These concerns can be minimized by increasing the density of vehicle numbers with GPS receivers or by narrowing the focus of the study (e.g., to a specific corridor or trip generator of interest). However, widespread utilization of GPS equipment to collect data on freight movements is cost prohibitive relative to the value of data obtained. Table 2 presents the advantages and disadvantages of using GPS receivers.

Table 2: Advantages and Disadvantages of GPS Data

	Advantages	Disadvantages
Implementation	No traffic disruption.	Requires private shipper participation.
Investment and maintenance		Very high equipment investment cost. Equipment malfunction and technical difficulties are common.
Statistical reliability/sampling frame		Limited sample of vehicles participating in the study. Very limited sample of all freight movements in urban setting.
Data attributes	Relatively accurate route and trip activity data.	Very limited information regarding trip purpose, commodity hauled and trip chaining.
Geographic coverage		Limited to sample size.
Commodity		Does not capture types of commodities hauled.
Seasonality		Does not capture seasonality of shipments.

Source: Jessup et al. (2004).

Freight Survey / Questionnaire

Establishment Survey

An establishment survey is conducted at the place of business. The survey can collect data on the total trips of trucks to/from the surveyed establishments within a specified reporting period (day/week/month), trip purpose, value of shipments, and supply chain information.^{15,16} Some respondents, however, may not be able to provide sufficient information about other attributes, like origin of the vehicle, commodity being shipped by each vehicle, trip destination, etc.¹⁵ Data are collected through a mail survey, interview survey, or a combination of both.

Interview Survey. An interview survey can be accomplished through face-to-face or telephone interview. In some cases, the truck owner is not the best agent to ask for information about the daily use of the trucks. Hence, the first challenge with this methodology is finding a respondent who is willing to participate and able to provide the necessary information, which leads to potential information bias. Once the contact person is identified, the next steps are to obtain participation and schedule the interview. The respondent may be sent a copy of the survey before the interview so that he or she can become familiar with the questions and have sufficient time to prepare.

Due to personal contact, interview surveys typically have higher response rates compared to mail surveys. In this methodology, having the interviewer present makes it easier for respondents to clarify any details in the questionnaire. This format also allows the interviewer to delve into more detailed information about particular responses and ask to follow up with the contact persons if needed. Interview surveys are easy to implement and can be used to supplement information obtained through other data collection techniques.

Trucks are utilized for a variety of different shipment types, routes, commodities and origin-destination combinations. Identifying specific trip details about all shipment types is quite difficult in a telephone interview but may be less difficult in a face-to-face interview since the respondent could show the interviewer printed reports and other supporting data.

Carrying out face-to-face interviews can be very costly depending on the sample size. On the other hand, telephone interviews can cover a large sample size at less cost than face-to-face interviews (e.g., no travel costs). The drawbacks of a telephone survey include difficulty of obtaining accurate contact information and problems with follow-up calls (e.g., incorrect phone numbers).

For either a face-to-face survey or a phone survey method, there are time constraints since interviews can only occur during regular business hours and they can be cut short or interrupted when the respondent is busy. Therefore, data collection through this method can be time consuming and costly. Furthermore, data may be biased to those vehicles licensed within a given urban or metropolitan area. Table 3 presents the advantages and disadvantages of this methodology.

Table 3: Advantages and Disadvantages Face-to-Face or Phone Surveys

	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic. Quicker turn-around than mail survey. Higher response rate than mail survey. Allows for more in-depth discussion of particular responses. Easy to follow up with contacts. Face-to-face survey makes it easier for respondent to share reports and other supporting data to the interviewer. Phone survey can cover a larger geographical area since the interviewer does not need to travel to the respondent's place of business.	Difficult to find appropriate and accurate contact information. Can be time consuming and expensive. Need to do call-backs. Higher personnel requirement compared to mail survey.
Investment and maintenance	Low investment requirement.	Must be replicated periodically to maintain current relevance.
Statistical reliability/sampling frame	Generally good information for those that respond. Survey design may include targeted truck movement types.	Low response rate may create biased data. Difficulty finding appropriate respondent also contributes to bias or non-response.
Data attributes	Very good data details for completed responses.	
Geographic coverage	Generally limited to those vehicles within the area.	Poor coverage of urban truck movements from trucks licensed in other states and areas.
Commodity	Survey design may include specific commodities.	
Seasonality	Survey design may include seasonality of trips.	

Source: Jessup et al. (2004).

Online Survey. Establishment and shipper surveys may also be conducted via web-based, online avenues, either through survey questionnaires that have been developed by survey centers, educational institutions or third-party technology services companies such as SurveyMonkey, Checkbox Survey, SurveyGizmo, Zoho Survey, Typeform and others. These data collection techniques are common for obtaining information quickly and at relatively low cost and can reach a broad audience.

Similar to mail surveys, the online survey can also result in relatively low response rates. The primary method for sending out these types of surveys is via email (often blocked via spam filters) and/or via social media platforms such as Facebook, LinkedIn and Twitter. The types of information which can be obtained may be limited to relatively easy surveys related to individual experiences. Response rates for complicated information related to business operations, shipment origin/destination and routing are often low due to the medium. The advantages and disadvantages of using online surveys are shown in Table 4.

Mail Survey. Mail surveys are one of the most common methods of collecting data from shippers or licensed truck owners. This methodology is very easy to implement and has low investment and maintenance costs. Personnel requirement is minimal, and data collected are generally of sufficient and accurate quality and detail, particularly from completed responses.

However, mail surveys typically have lower response rates which may bias the information collected. Like the interview survey, there is difficulty in identifying and ensuring that the appropriate person in the organization will be the one receiving the survey and providing responses. Also, mail surveys do not provide opportunities to clarify and discuss particular questions or answers and non-responses to specific questions are difficult to interpret. Survey coverage may also be quite low since freight movements by vehicles outside the geographical area are not included in the mail survey. However, given the easy and low cost of implementation, this approach may be useful to capture freight movements that are not accessible through other means. The advantages and disadvantages of using mail surveys are shown in Table 5.

Table 4: Advantages and Disadvantages of Online Surveys

	Advantages	Disadvantages
Implementation	Easy to implement, low cost. No disruption of traffic.	Difficult to identify and deliver survey link to individual knowledgeable of data desired. Challenge getting trip detail for all shipment types that the shipper or trip generator may possess.
Investment and maintenance	Low investment requirement. Minimal personnel requirement.	Must be replicated periodically to maintain current relevance. Response rates drop on repeated replications.
Statistical reliability/sampling frame	Challenge controlling for known population/sample size. Generally good information for those that respond. Survey design may include targeted business types.	Low response rate may create biased data. Difficulty finding appropriate respondent also contributes to bias or non-response.
Data attributes	Good data details for completed responses.	Limited ability to clarify meaning to specific questions or answers.
Geographic coverage	Can cover large geography at low cost.	Poor control of coverage of freight movements, given online presence and some large freight companies not having much online presence.
Commodity	Survey design may include specific commodities.	Difficult to obtain detailed information on commodity types that are shipped.
Seasonality	Survey design may include seasonality of trips.	Difficult to obtain detailed information on commodity types that are shipped.

Table 5: Advantages and Disadvantages of Mail Surveys

	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic.	Difficult to obtain trip detail for all shipment types that the shipper or trip generator may possess.
Investment and maintenance	Low investment requirement. Minimal personnel requirement.	Must be replicated periodically to maintain current relevance.
Statistical reliability/sampling frame	Generally good information for those that respond. Survey design may include targeted truck movement types.	Low response rate may create biased data. Difficulty finding appropriate respondent also contributes to bias or non-response.
Data attributes	Very good data details for completed responses.	Limited ability to clarify meaning to specific questions or answers.
Geographic coverage	Generally limited to those vehicles within the area.	Poor coverage of urban truck movements from trucks licensed in other states and areas.
Commodity	Survey design may include specific commodities.	Difficult to obtain detailed information on commodity types that are shipped.
Seasonality	Survey design may include seasonality of trips.	Difficult to obtain detailed information on commodity types that are shipped.

Source: Jessup et al. (2004).

Combined Mail and Telephone Survey. Combining a mail and interview, particularly by phone, survey format can significantly improve response rates compared to implementing either individually. However, this causes the cost of implementation to significantly increase. The telephone contact prior to the mail survey, and as a follow-up, provides the opportunity to increase response rates and enhance qualitative information about freight movements. It may be that information about other relevant trip generators may also be available. Although the two data collection methods are combined, the majority of the data are collected via the mail survey.

Both mail and interview surveys are limited to the list of registered vehicles or firms within the area of study, thus there remains poor coverage of movements by trucks that are licensed in other areas. The advantages and disadvantages of the combined mail and telephone survey are presented in Table 6.

Table 6: Advantages and Disadvantages of Telephone-Mail Survey

	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic. Quicker turn-around than mail survey alone.	Difficult to find appropriate and correct phone numbers. Can only call during regular business hours. Follow-up calls may be time consuming and costly. More costly than telephone survey or mail survey alone.
Investment and maintenance	Moderate investment requirement in personnel.	Must be replicated periodically to maintain current relevance. Higher personnel requirement when compared to mail survey.
Statistical reliability/sampling frame	Generally good information for those that respond. Survey design may include targeted truck movement types.	Low response rate may create biased data. Difficulty finding appropriate respondent also contributes to bias or non-response.
Data attributes	Compared to mail survey only, there is improved ability to explain questions and clarify intent, leading to better data details.	
Geographic coverage	Generally limited to those vehicles within the area.	Poor coverage of urban truck movements from trucks licensed in other states and areas.
Commodity	Survey design may include specific commodities.	
Seasonality	Survey design may include seasonality of trips.	

Source: Jessup et al. (2004).

Shipper / Trucker Survey

A shipper/trucker survey or freight operator survey is used to collect data about the pattern of the operator's truck activities within the area of study. Other data that can be obtained through this survey method are information about the entire vehicle fleet (as opposed to a single vehicle), loading/unloading activities, trip purpose, etc.¹⁵ The data gathering activities are commonly implemented through interview surveys (face-to-face or telephone), mail surveys, or a combination of both. The advantages and disadvantages of each of these methods are described above and summarized in Tables 3-6.

Roadside Survey

A roadside survey is implemented by conducting direct personal interviews of truck drivers at accessible locations, such as weigh stations on interstate highways and freeways or toll and bridge crossings. Prior studies have demonstrated many advantages of utilizing roadside interviews, particularly in terms of

obtaining a high response rate and complete information related to origin, destination, routes, loaded weight, empty weight, commodity transported, truck owner, and other characteristics. The driver is also the most knowledgeable of the current shipment characteristics which helps in the identification of the primary contact person, mitigating a disadvantage for interview surveys. This methodology has good sampling control, broad geographic coverage, and easy implementation requirements. Because the sample collected is from a known traffic population in a given time period, the statistical reliability of road surveys is also quite high, and it allows one to extrapolate all information collected to the entire vehicle population. Also, the interaction between respondents and survey personnel enables clarification of specific questions on the spot, hence minimizing any misunderstanding and errors in data entry. The survey can also capture the seasonality of moving commodities, such as agricultural products, by collecting data at different periods throughout the year.

There are also some disadvantages in using roadside surveys. For instance, implementation requires sizable labor services. Survey personnel needs to be properly trained and communication and coordination are needed among the survey crew, law enforcement agency (helping to pull over vehicles), Department of Transportation personnel, and facility operators. Implementation may also disrupt traffic in high volume corridors. This methodology is constrained to truck traffic that is passing through designated survey locations. Another constraint is time. Survey personnel need to be clear with their questions while at the same time being cognizant of the short time to accomplish the survey so as not to disrupt the driver's schedule and because follow-ups are not possible after the interview. Survey personnel may also be exposed to safety risks and adverse weather conditions. Table 7 shows the advantages and disadvantages of road surveys.

Table 7: Advantages and Disadvantages of Roadside Surveys

	Advantages	Disadvantages
Implementation	Relatively easy to implement. Short interview (2 to 6 minutes).	Time constraint. Relatively high labor requirement especially for large geographic areas. Potential disruption of traffic. No follow-ups. Significant risk to survey personnel.
Investment and maintenance	If managed properly, investment costs are relatively low.	Must be replicated periodically to maintain current relevance. Higher personnel requirement than interview survey.
Statistical reliability/sampling frame	Best sample control since sample is from known traffic population over a known time period. Highest response rate.	Limited locations where survey is implemented may bias sampling.
Data attributes	Excellent ability to obtain all desired data given one-on-one interaction with driver. Complete information on origin, destination, route, commodity, etc.	None.
Geographic coverage	Provides coverage of truck activity other than at survey locations but truck must first pass through survey site. Includes vehicles passing through from outside geographical area.	Only captures traffic that passes through interview sites.
Commodity	Provides information on the type of commodity being transported.	None.
Seasonality	Captures the seasonality of moving commodities, such as agricultural products.	Relatively high labor requirement since data need to be collected at different periods throughout the year.

Source: Jessup et al. (2004).

Vehicle Video / Image Capture

Vehicle recognition through video surveillance or image capture is another high-tech means of collecting freight movement data, particularly counts and classifications of vehicles passing through selected routes at a specific time of day and day of the week. The main advantage of this methodology is the collection of good information on traffic flows without disrupting traffic. However, it does not provide data on origin and destination, trip purpose, route, and types of commodity transported. The high initial equipment cost and maintenance costs, as well as potential technical problems due to adverse weather and time of day are additional limitations of this methodology. However, data collected from video surveillance can be effective when complemented by information collected from other sources and data sets. The advantages and disadvantages of this methodology are presented in Table 8.

Table 8: Advantages and Disadvantages of Vehicle Video/Image Capture

	Advantages	Disadvantages
Implementation	No traffic disruption.	Potential for equipment failure or technical difficulties. Adverse weather and time of day can impact visibility and data collection.
Investment and maintenance		High equipment cost and requirements. Relatively high maintenance and replacement cost for video equipment.
Statistical reliability/sampling frame	Captures all trucks passing a video site during all visible time periods.	Provides limited information.
Data attributes	Provides general descriptive information on traffic flows, e.g., count and classification of vehicles at a specified time period.	No information about origin and destination, trip purpose, route, etc.
Geographic coverage		Limited to locations with video capability within and around urban areas.
Commodity		Does not provide information on the type of goods being transported.
Seasonality		Cannot capture the seasonality of moving commodities, such as agricultural products.

Source: Jessup et al. (2004).

Table 9 provides a summary of the types of data that can be collected using the different survey approaches.

Table 10 shows the common methods used to implement the survey approaches.

Table 9: Types of Data Collected via Different Survey Approaches

Type of data	Survey Approaches				
	Establishment Survey	Shipper/Trucker Survey	Roadside Survey	Technology Provider Survey	Vehicle Video/ Image Capture
Vehicle trip generation at establishments*	○	●	●	●	●
Goods/service flows at establishments*	○	●	●	●	●
Ordering/stockholding at establishments*	○	●	●	●	●
Vehicle trip purpose*	○	○	○	●	●
Goods carried by each vehicle*	●	⊗	○	●	●
Detailed vehicle trip patterns*	●	⊗	⊗	○	●
Vehicle routing*	●	⊗	⊗	○	●
Vehicle fuel/speed/fleet data*	●	○	⊖	⊖	●
Origin of vehicle trips*	⊖	⊖	○	○	●
Destination of vehicle trips**	⊖	⊖	○	○	●
Loading/unloading activities*	⊖	⊗	●	●	●
Loading/unloading dwell time*	⊖	⊗	●	⊗	●
Supply chain system of organizations*	○	⊗	●	●	●
Traffic flow and mix*	●	●	●	●	○
Vehicle classification**	●	○	○	●	○
Seasonality of shipments**	⊗	⊗	○	●	●

*Adopted from Allen et al. (2012); **Added from Jessup et al. (2004)

Notes: ○ means data are commonly collected with this survey approach; ⊖ means data are sometimes collected with this survey approach; ⊗ means data could be collected with this survey approach but it is not common; and ● means data could not be collected with this survey approach.

Table 10: Common Avenues for Implementing Survey Approaches

Implementation Method	Survey Approaches				
	Establishment Survey	Shipper/Trucker Survey	Roadside Survey	Technology Provider Survey	Vehicle Video/ Image Capture
Face-to-face interview (scheduled)	○	○	●	●	●
Face-to-face interview (intercept)	○	⊗	○	●	●
Online Survey	○	○	●	●	●
Telephone survey	○	○	●	●	●
Mail survey	○	○	●	●	●
GPS receiver	●	●	●	○	●
CCTV	●	●	●	●	○

Sources: Allen et al. (2012); Jessup et al. (2004).

Notes: ○ means data are commonly collected with this survey approach; ⊗ means data are sometimes collected with this survey approach; ⊗ means data could be collected with this survey approach but it is not common; and ● means data could not be collected with this survey approach.

Freight Data Inventory Summary

The report has provided a summary of the different types of data currently available to the Idaho Transportation Department to help develop the freight data collection plan. Examples of these different types of data have been provided, in addition to the strengths and weaknesses associated with each data source. In addition, this report provides a summary of the different approaches and avenues for supplementing existing freight data. Each one of these approaches also present different challenges in capturing specific aspects of the freight supply chain, costs of obtaining the information and ease of replication into the future. These issues are discussed, and the advantages / disadvantages of each approach offered.

The freight data collection plan will identify a strategy of utilizing the existing data from various public and private sources and supplementing these data by performing one or utilizing a combination of the alternative data collection approaches described in this document. Each alternative approach should be evaluated in terms of their implementation, collection, and applicability to inform specific freight-related activities. The advantages and disadvantages of each approach and implementation method need to be taken into account, such as those related to response rates, potential costs, and data details.

Chapter 2: Idaho Freight Data Collection Plan

Objective

The overall objective of the freight data collection plan was to provide a roadmap for collecting and compiling information on freight and commodity flows within and through the state and to provide detailed analysis for those major supply-chains supporting the state's freight economy. This objective was achieved through the combination of the following individual objectives:

- Identify key industry and economic clusters that are relevant for Idaho's freight economy.
- Compile facilities database (geographic) that constitutes freight generating or delivery points (origins/destinations) within each economic sub-cluster.
- Obtain EROADs² data and conduct analysis to match truck routes with facilities database.
- Analyze and evaluate EROADs data coverage by freight type and trip characteristics.
- Supplement data gaps with targeted establishment or roadside surveys in order to compile information related to inbound/outbound freight movements
- Compile all survey data and incorporate into key supply-chain analysis

Freight Data Plan Sub-Tasks

Task 1: Identify Key Industry and Economic Clusters

The following economic and industry classifications represent both the economic activities of Idaho³ and those dominate freight categories as reflected by FAF data and the earlier report on available freight data.

- i. Agriculture and Food Processing
 - a. Grain
 - b. Dairy
 - c. Hay
 - d. Potato
 - e. Cattle
- ii. Forest Products / Construction
 - a. Sawmill/Pulp mills
- iii. Computer and Electronics Manufacturing
 - a. Micron, Hewlett-Packard, ON Semiconductor, HK Hynix
- iv. Healthcare Services
 - a. Hospitals

² Freight telematics and technology solutions provider (<http://www.eroadglobal.com/>)

³ According to the January 2018 Idaho Economic Forecast conducted by the Division of Financial Management, Executive Office of the Governor.

- v. Mining / Minerals
- vi. Transportation/Equipment Manufacturing
- vii. Warehousing/Distribution Centers

Even within each category, many different freight supply-chains exist, each comprising unique freight data attributes, shipment characteristics, origins/destinations, seasonality, vehicle configuration and volume/weight dimensions. One example would be within the mining and minerals industry which includes many different types of mining operations from aggregate/gravel mines to specialized mineral extraction, representing over 643 mine locations throughout the state. However, only about 25 locations represent significant, active mining operations according to the Idaho Mining Association. It is unlikely given the resources available that this study will be able to illuminate freight characteristics for all Idaho supply-chains, but instead will focus on those most prominent and for which data may be effectively obtained. The classification of freight industry type allows improved grouping by economic activity.

Task 2: Compile Facilities Database within Each Industry Group

This task involved compiling the primary freight facilities (originating / receiving) within each economic classification above. This was compiled utilizing a variety of existing data sources (primarily public sources) and supplemented/verified with phone calls to businesses and industry groups. The information on facility locations were developed within ArcGIS and the data (shapefile) made available to the Idaho Transportation Department.

Deliverable 1: ArcGis Idaho Freight Facilities Database

The deliverable was included in the primary freight facility locations for the state of Idaho, compiled in ArcGIS.

Task 3: Obtain EROADs Truck Trip Data and Evaluate

This subtask involved obtaining and then analyzing truck trip data from the private technology services providers (EROADs) in order to understand specific freight supply-chain characteristics common to each group of facilities within the economic categories above. Given that this type of data is not publicly available, the partnership with EROADs for this type of statewide freight analysis represents new possibilities. Likewise, the merit and value of this type of data is still largely unknown for states similar to Idaho and therefore represents one of the core outcomes of this research project, assessing how this information may be utilized in freight planning. The primary focus for utilizing this truck trip data was to better understand freight characteristics associated with each of the primary supply-chains in the state. Thus, the data was evaluated in the following manner:

- Query EROADs data (truck transponder) by facility type and location, matching truck routes common to each facility
-

- Identify and summarize freight characteristics from EROADs data by supply-chain type, including (if possible):
 - Routes used and intensity
 - Vehicle configuration
 - Volume (number of trips)
 - Seasonality
 - Intersection with other modes (rail, water, air)
 - Commodity type

This analysis was also included to identify data limitations (truck freight population sampling) or challenges associated with utilizing this information to characterize freight supply chains. It was likely that for certain types of freight movements in the state, the EROADs data would be richer than for other types of freight movements, primarily related to the types of carriers utilizing EROADs services. Thus, not all freight supply-chain information was likely to be populated from the EROAD data analysis. The degree of information and data gaps wouldn't be fully understood until the analysis had been conducted. But information to supplement those data gaps would then be obtained through a combination of business/establishment surveys and/or roadside surveys.

Deliverable 2: Summary Assessment of EROADs Data

Task 4: Freight Data Collection Surveys: Establishment and Roadside

The extent of the freight survey activity depends largely upon the breadth and quality of data available from the EROADs transponder information. But it is expected that for many businesses and facilities (classified by the economic cluster and supply chains above) there would be data available on highway freight shipments, including some of those attributes identified above. The connection of truck trip (route) information to specific types of facilities (including rail and water) would aid in understanding freight supply chain characteristics related to routes used, frequency of shipments and potential constraints impeding movement or flow. But there were still likely to be gaps in coverage which would be populated from targeted freight surveys. Depending on the nature of those data gaps, the supplemental information would be populated from either:

1) Establishment or Business Surveys

These surveys were designed to elicit information related to freight activities at a facility or business, including attributes such as inbound/outbound freight shipments, commodity types, volumes, seasonality of flows, storage capacity, vehicle configuration and an understanding of factors that affect freight activity. This information may be aggregated across facilities with similar characteristics at different locations, but managed by one company. Information related to specific trip characteristics for inbound/outbound freight are typically not well known by managers at the facility or establishment, but rather from drivers and those entities actually moving the freight.

Implementation: These surveys were implemented via an online web interface, with follow-up telephone calls as needed. This allowed a broader type of freight supply chain data to be

collected at a relatively low cost, compared to other avenues (mail, face-to-face, email, etc.). These may either be conducted through Qualtrics or another online provider.

2) Roadside Truck Surveys

The roadside survey provides good data on trip attributes from vehicles passing specific locations on the highway network. Unfortunately, there are limited locations where trucks may be sampled and surveyed, typically at ports of entry or permanent weigh stations managed by the commercial vehicle enforcement officers. And not every truck can be surveyed, given parking limitations, thus creating sample bias during periods of heavy freight activity when the sample size gets smaller.

Implementation: These surveys, if needed, would have been targeted for implementation by officers working at the weigh stations and ports of entry in Idaho.

Examples of these specific survey questionnaires are included in the Appendix but may be modified in order to obtain necessary freight attribute information unique to each supply chain. If any are needed, the survey instruments would have undergone an Institutional Review Board⁴ (IRB) processes before implementation.

Task 5: Compile Freight Data

All data collected from the establishment and roadside surveys were compiled into a database and made available to ITD. This is the data that was utilized to detail each primary supply chains.

Deliverable 3: Database of Collected Freight Data

Freight Data Collection Timeline

The research effort would be conducted over 18 months, beginning in Sept/Oct 2017. Below is the expected timeline associated with the project, by work task and deliverable.

⁴ The Institutional Review Board (IRB) is an administrative body established to protect the rights and welfare of human research subjects recruited to participate in research activities conducted under the auspices of the institution with which it is affiliated. [Oregon State University Institutional Review Board Website](#)

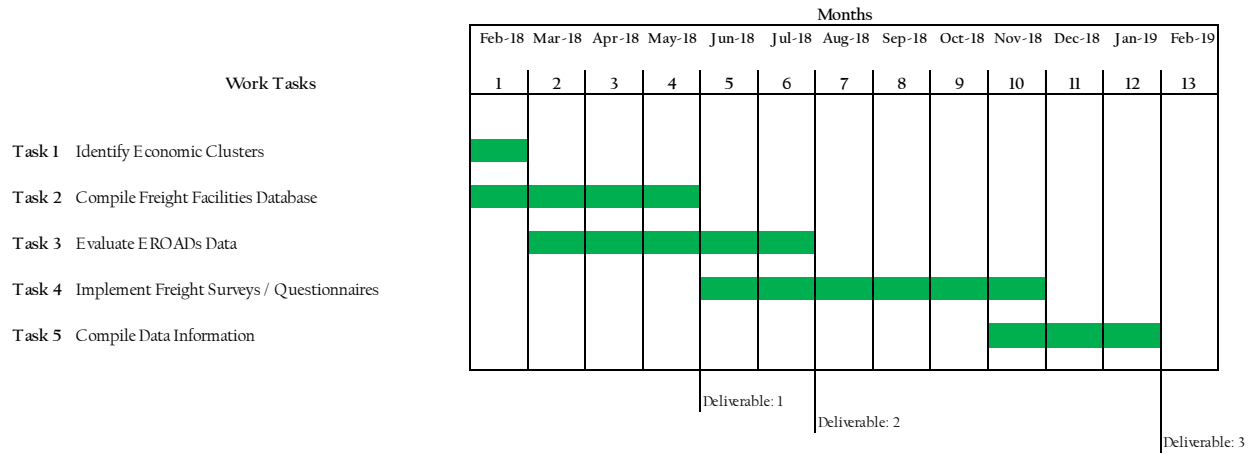


Figure 14. Freight Data Collection Timeline

Chapter 3:

Freight Data Inventory and Supply-Chain Analysis

Introduction

This research project would address the freight data gap that currently exists regarding available statewide freight and commodity flow information by developing and implementing a statewide freight flow survey. Detailed information on commodity movements throughout the transportation system across the state will be provided. In addition, for those commodities that represent significant components of the state's economy (in terms of either volume or value), detailed information and analysis of these specific supply-chains will be provided.

One significant challenge faced by state transportation agencies is adequately addressing current and future transportation system needs based upon existing and evolving transportation activity on the multi-modal network. That network supports many different types of users and businesses throughout the region. State transportation planners are often reactionary in anticipating future investment needs, primarily given the available data on system use being historically limited to vehicle traffic counts on various highway segments throughout the state transportation network. This data can be divided into different vehicle types, but for freight vehicles it provides no information related to the commodity being transported or the origination/destination of the shipment. As such, while it is possible to identify changes in system use over time, it limits the ability to understand how current businesses and industries throughout the state depend and rely upon specific aspects of the transportation system. This creates challenges in allocating limited state funds to investments and improvement of the transportation system without knowing specifically how businesses and industries are dependent upon specific parts of that network. With this information, investments throughout the network may be made proactively rather than reactionary, to anticipate and support future growth of those industries and businesses that support the state's economy and also present positive growth and expansion prospects into the future. Furthermore, developing and maintaining this information regarding the primary freight and commodity supply chains compliments and strengthens the existing Idaho State Freight Plan and the prioritization of freight projects, a requirement for eligibility of federal freight monies.

The primary objective of this Report is to utilize the freight data collected and compiled into a geographic database from previous tasks in order to: identify and evaluate the primary freight supply-chains in the state; and provide a geographical presentation of these supply chains.

Section 2 describes the survey techniques employed to collect the freight data by industry type. Appendixes at the end of the Report shows detailed data collected from the freight establishment survey (Appendix 1), supply-chain maps for the various industries based on EROAD data records (Appendix 2), and EROAD freight data by industry type (Appendix 3). The appendices supplement the summary presented in this section. Section 3 integrates the findings from the surveys and discusses the potential implications.

Key Industries in the Supply-Chain

The data and information collected in this Report will show the various types of industries and businesses supported by various parts of the Idaho transportation system. The key industry types include agriculture and food processing, forest products, computer/electronics manufacturing, healthcare services, mining/minerals, transportation equipment, and warehousing/distribution centers.

Agriculture and Food Processing

The top five agricultural commodities in Idaho as of 2017 are milk, cattle and calves, potatoes, hay, and wheat.¹⁷

Milk (all)

Idaho is the fourth-largest producer of milk in the United States. All of Idaho's dairy farms are family owned and operated. Majority of dairy producers and processors are located in Southern Idaho (78.8 percent) and a smaller portion is in eastern Idaho (21.2 percent). Idaho is also the nation's third largest cheese producer and among milk products exported, milk powders are the state's leading dairy export.¹⁸

At the national level, it is forecasted that revenues from the production of dairy products will slightly increase at an average annual rate of 0.1 percent, reaching \$106.7 billion in the next five years to 2024. Increased consumer demand for healthier dairy products and innovations by producers in diversifying their product lines contribute to the increase in overall industry revenue.¹⁹

Cattle and Calves

Idaho ranks 12th in the U.S. for all cattle and calves as of 2017.¹⁷ All cattle inventory in the state was estimated at 2.5 million heads as of January 2019, an increase of 3 percent relative to previous year.²⁰ Cattle and calves are raised in all counties of the state. The most cattle dense county is Gooding county with about 300,000 heads as of 2018, followed by Cassia county (255,000 heads), and Jerome county (215,000 heads); altogether accounting for 32 percent of all cattle and calves in Idaho.²¹ Idaho beef is sold to both domestic and foreign markets. Beef export is in the top 4 Idaho agriculture exports and valued at \$179.2 million in 2017. The U.S. beef production and exports are forecasted to increase by 2 percent and 3 percent, respectively, in 2019 compared to last year.²²

At the national level, overall industry revenues in beef cattle production is forecasted to decline at an average annual rate of 0.9 percent between 2018 and 2024 due to declining price of red meat, weakening consumer demand, and increasing price of feed.²³

Potatoes

Idaho is the leading producer of potatoes in the United States. In 2018, Idaho growers harvested 315,000 acres of potatoes, representing 30.8 percent of total U.S. acres and 30.9 percent of total production. Potato production acreage has been changing over the past decade, and planted acreage increased by 2 percent between 2017 and 2018.²⁴ The majority of potato acres (90 percent) are planted

to Russet varieties — Burbank, Norkotah, Ranger and Wilson, and the remaining are niche varieties such as golds, reds and fingerlings. Forty three percent of all Idaho potatoes are fresh, 43 percent are used in processed products (i.e., frozen, dehydrated), and the remainder are grown for certified seed.²⁵

The top five export markets of U.S. potatoes as of 2017 are Japan, Canada, Mexico, South Korea and Philippines. Majority of the potato products exported are frozen French fries (59 percent), followed by fresh potatoes (29 percent), dehydrated (7 percent) and, potato chips and seed (6 percent).²⁵

Over the period 2019 to 2024, the overall potato farming industry revenues are projected to increase at about 0.5 percent per year, on average. Contributing factors to this industry outlook include strong demand for potato products and product diversification, catering to consumers looking for gluten-free food alternatives and/or healthier alternative snacks (e.g., baked or popped potato instead of fried snacks).²³

Hay

Hay ranks fourth in Idaho's top agricultural commodities in terms of value of production as of 2017, at \$718 million, following potatoes.¹⁷ Idaho is the major producer of certified organic hay in the country and is the second largest U.S. producer of alfalfa hay. The markets of hay are different based on quality. The supreme grade alfalfa hay is commonly sold to dairies. The premium grade hay is mostly exported but may also be sold in retail. The good grade hay is mostly exported, although a small amount is sold to dairies as dry cow feed. The feeder hay is commonly sold to cow/calf operations and feed lots or kept for the farmer's own cattle. As of 2018, less than 3.5 percent of all U.S. hay and about 5 percent of U.S. alfalfa are exported.²⁶

Idaho and national average monthly hay prices in January and February 2019 hold steady and are generally higher compared to last year. Hay market values are typically high from December to spring, peaking in April or May.²⁷ The demand for hay mainly comes from livestock farmers, who use hay as feed. Price fluctuates with the price of corn, which is a primary feed for livestock. Between 2018 and 2024, hay industry revenue is projected to increase by 0.6 percent on average per year. The demand is primarily driven by livestock production, price of hay relative to alternative feeds, and exchange rates. Organic farming, driven by consumer's preferences for healthier food, is also forecasted to have a role in driving the growth in organic hay production. High-value organic hay will be sought by farmers producing organic beef.²⁸

Wheat

Wheat has a value of \$426 million in 2017, ranking fifth in Idaho's top agricultural commodities.¹⁷ In 2018, Idaho growers harvested 1,136,000 acres of wheat, representing 3 percent of total U.S. acres and 6 percent of total production.²⁴ Major producing counties include Idaho, Lewis, Nez Perce, and Latah from the northwest region and Bingham, Power, and Cassia from the south.²⁹ Nearly half of all Idaho wheat is sold to foreign markets, and it is considered as one of Idaho's top export agricultural products.

The domestic and international outlook for U.S. wheat in 2018/19 marketing year are low. USDA NASS reported that all wheat area planted for 2019/2020 is the lowest on record since 1919 (when recording began). Utilization rate for wheat annual feed and residual use is lower than expected in the third quarter of the 2018/19 marketing year due weak demand. The relative price of wheat to corn is an important driver, and the wheat-corn price ratio is 1.46, which is well above a 10-year average of 1.35. Exports during this period are 20 million bushels lower than previously projected due to the slow pace of sales.³⁰

Forest Products

Idaho's forest products industry contributes more than 300,000 jobs and \$2 billion to Idaho's economy. Total timber harvest in Idaho in 2016 was about 1.1 billion board feet Scribner log scale.³¹ The industry is comprised of forest management, logging, wood and paper products manufacturing.³² As of 2011, there are 88 primary wood facilities – sawmills, plywood/veneer plants, log home facilities, residue related products facilities, cedar product manufacturers, and post, pole and log furniture producers that are active in Idaho.³³ The locations of these facilities are shown in figure 15. Out of the 44 counties in Idaho, timber processing facilities operated in 27 counties, and timber harvesting in 29 counties. The industry is concentrated in the northern part of the state.

As of 2011, about 57.7 percent of all timber harvest are privately owned, and 42.3 percent are public timberlands (32 percent State, 9.7 percent National Forest, and 0.6 percent Federal Bureau of Land Management). True firs and Douglas fir were the largest components of Idaho's timber harvest, accounting for 59 percent of all species harvested during this period.³³ All species are used to produce lumber. Majority of the harvest is processed within the state (91 percent) and the remaining is shipped to processors outside the state. Of the \$612 million in sales of primary wood products, 97 percent come from domestic sales and 3 percent from exports. Simmons et al. (2014) forecasted growth in the wood products market due to expected economic recovery, increase in new home constructions, and unutilized processing capacity of U.S. lumber processing facilities (including Idaho mills)

The U.S. sawmill and wood production industry revenue is projected to increase at an average rate of 1.1 percent per year in the next five years (2019-2024). This growth is attributed to forecasts of continued low unemployment and lower corporate tax rates that will boost residential and non-residential housing, as well as expected increase of exports to China in light of the country's lowering its tariffs on wood pulp as of 2019.³⁴

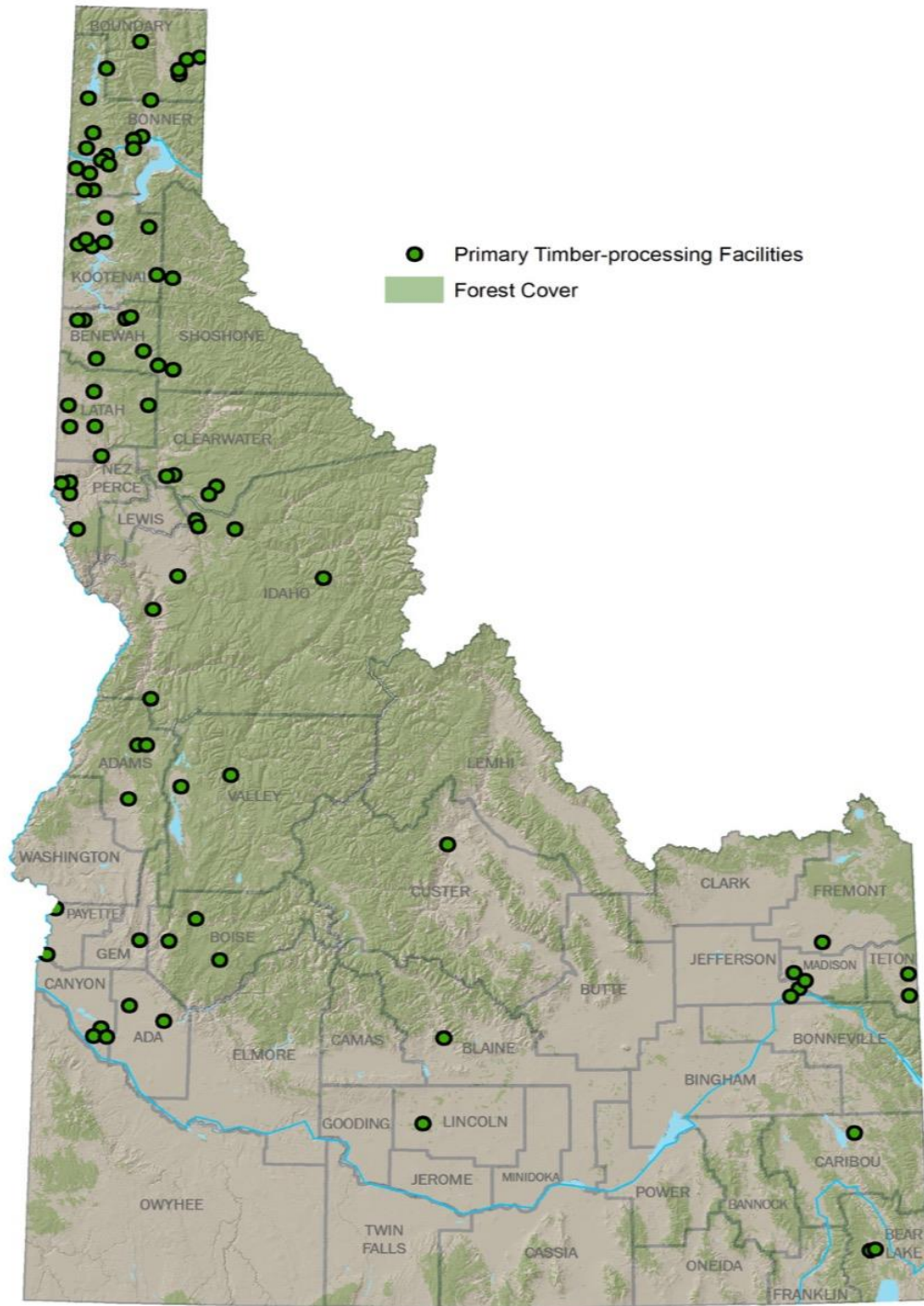


Figure 15. Map of Primary Wood Facilities in Idaho.

Source: Simmons, et al. (2014)

Computer Manufacturing

The U.S. computer manufacturing industry in the United States has an estimated revenue of \$10.7 billion in 2018 and is projected to increase to \$11.2 billion in 2024, implying an annual average growth rate of 0.7 percent over the said period. The share of households that own at least one computer is about 88 percent in 2018 and expected to increase to 95 percent in 2023, brought about by falling prices of computers, and rising per capita disposable income anticipated in the coming years.³⁵

There are several computer and electronics manufacturing companies located in southern Idaho (primarily in Pocatello, Nampa and Meridian), representing an important component of the regional economy, both in terms of employment and products produced. These firms include Hewlett-Packard Enterprises, Micron, Samsung, ON semiconductor and HK Hynix which collectively employ approximately 12,000 people in the region.

Healthcare Services

The Idaho healthcare and social assistance sector is an important part of the state's economy and made up of establishments or facilities that provide healthcare and social assistance (i.e., counselors, psychologists, social workers), hospital and ambulatory services, inpatient and outpatient care, nursing and residential care, diagnostic and medical laboratory services, family and welfare services, and natural disaster and emergency relief services.

At the U.S. level the sector's revenue is projected to increase from \$2.2 trillion in 2018 to \$3.1 trillion in 2024, translating to an average of 2.2 percent growth rate every year. This growth is driven by continued increase in spending on sector services due to longer life expectancy, as well as aging and growing populations that are expected to require more health services and care; and by companies that are consolidating to lower their capital investments and labor costs leading to lower costs of care.³⁶

Mining and Minerals

Idaho is known as the Gem State, where its most famous gem is the star garnet.³⁷ It is home to 240 different minerals, including copper, gold and antimony. There are three mining districts in Idaho: (1) Silver Valley in northern Idaho, where silver, copper and gold can be found; (2) Stibnite Gold Project in the Central District, supplying the nation with antimony and tungsten; and (3) Phosphate District in southeast Idaho, where phosphate is a key ingredient in fertilizers. The mining industry supports about 12,000 jobs and contributes about \$980 million to the state economy in 2013.

The total industry revenue in gold and silver ore mining is dependent on gold, which generates 90 percent of the revenue. Overall revenue is forecasted to decrease at an average annual rate of 0.4 percent between 2018 and 2024 due to: unsteady demand as the Federal Reserve is expected to raise the interest rates to relieve inflationary pressures, which may drive people to invest more on fixed-income assets with higher returns (e.g., bonds) over gold and silver; more import penetrations of jewelry and shifting of jewelry production to offshore (thus reducing the domestic demand for gold and

silver as inputs in jewelry manufacturing); and increased competition in gold mining with other countries.³⁸

The mineral and phosphate mining industry, which supply inputs for the production of fertilizers, chemicals and other manufacturing applications (e.g., glass, plastics), is forecasted to grow between 2018 and 2024. The total industry revenue is projected to increase by 1 percent per year, on average. The main drivers of this growth are the expected increase in industrial production that use soda ash, boron and other minerals, and increase in fertilizer consumption by the agricultural sector.³⁹

Transportation Equipment

The manufacturing of transportation equipment, primarily truck trailers, is a significant and growing part of the Idaho economy. The economic outlook for this industry, in terms of future growth, rests primarily on the economic outlook for the industries served to move freight and the need for less or additional capacity. The past few years have exhibited relatively strong orders for Class 8 trucks and trailers as economic growth has been strong and heavy demand for freight services has resulted in tight capacity and likewise been good for equipment manufacturers. The near-term outlook (2019) commercial truck and trailer sales according to the National Truck Equipment Association (NTEA) is that the demand for equipment will continue to grow, but at a smaller rate than that experienced over the past two years. The fundamentals for economic growth in the truck freight industries are relatively strong, with some caution associated with national trade policies and the impact of tariffs. The most immediate impact of tariffs on the equipment manufacturing industry is higher steel and aluminum prices and some periodic parts shortages as disruptions appear in key supply chains.

Warehousing and Distribution

This section presents the projected industry growth for the following: farm product storage and warehousing; specialized storage and warehousing; and freight packing and logistics services.

The Idaho farm product storage and warehousing industry provides facilities and storage services, such as bonded warehousing for farm products and grain elevators. These facilities are important for Idaho, particularly given the concentration of potato production/processing, milk production/processing and grain merchandising that occurs throughout the southern part of the state. Between 2018 and 2024, total U.S. industry revenue is projected to decline by 0.2 percent on average per year due to expected increases in the prices of agricultural commodities, leading farmers to sell more of their harvest immediately and limiting speculative storage activities.⁴⁰

The specialized storage and warehousing industry's primary activities are: (1) operating automobile dead storage, bulk petroleum storage, chemical storage terminals, and lumber storage terminals; (2) warehousing whiskey; and (3) other warehousing and storage operation. Overall industry revenue is expected to increase at an average annual rate of 1.6 percent between 2018 and 2024 due to expected growth in consumer spending and consumer demand for industry services.⁴¹

The U.S. freight packing and logistics services industry is comprised of companies that provide the following services: packing, crating and wrapping goods for transportation, freight consolidation, trade document preparation, storage of goods prior to and after freight, physical distribution consulting, and logistics consulting. The total industry revenue is forecasted to grow by an average of 2.2 percent per year between 2018 and 2024 due to expected increases in the volumes of freight brought by continued growth in consumer spending and international trade during the same period.⁴²

Methodology and Data Collected

Two data collection techniques have been employed to capture different aspects of freight and commodity flow activities within and throughout the state of Idaho; in particular, freight establishment surveys and EROAD. To better understand the freight activities of various industries, key survey results are presented below by survey technique and by industry type.

Freight Establishment Survey

An establishment survey is conducted at the place of business. The survey can collect data on the total trips of trucks to/from the surveyed establishments at a specified reporting period (day/week/month), trip purpose, value of shipments, and supply chain information.^{15,16} Some respondents, however, may not be able to provide sufficient information about other attributes like origin of the vehicle, commodity being shipped by each vehicle, trip destination, etc.¹⁵

Freight establishment surveys have been designed with the intent of eliciting information about freight activities at a facility or business. The survey instrument was developed using the Qualtrics online survey platform and distributed via email. Specific information collected include the following:

- Inbound/outbound freight shipments.
- Commodity type.
- Volume of shipments.
- Seasonality of flows.
- Storage capacity.
- Type of roadway used to distribute or receive freight shipments.
- Facility or business-related information (e.g., number of employees, duration at current location, etc.)

Survey respondents are grouped into the following industry types: Agriculture, Forestry, Fishing, and Hunting; Computer and Electronics Manufacturing; Mining; Retail; Transportation and Warehousing; Wholesale; Other Manufacturing, and Other Industry (the type of industry has been specified by the survey respondent). Figure 16 shows the distribution of industry types represented in the survey. Responses to each survey question are shown in Appendix 1.

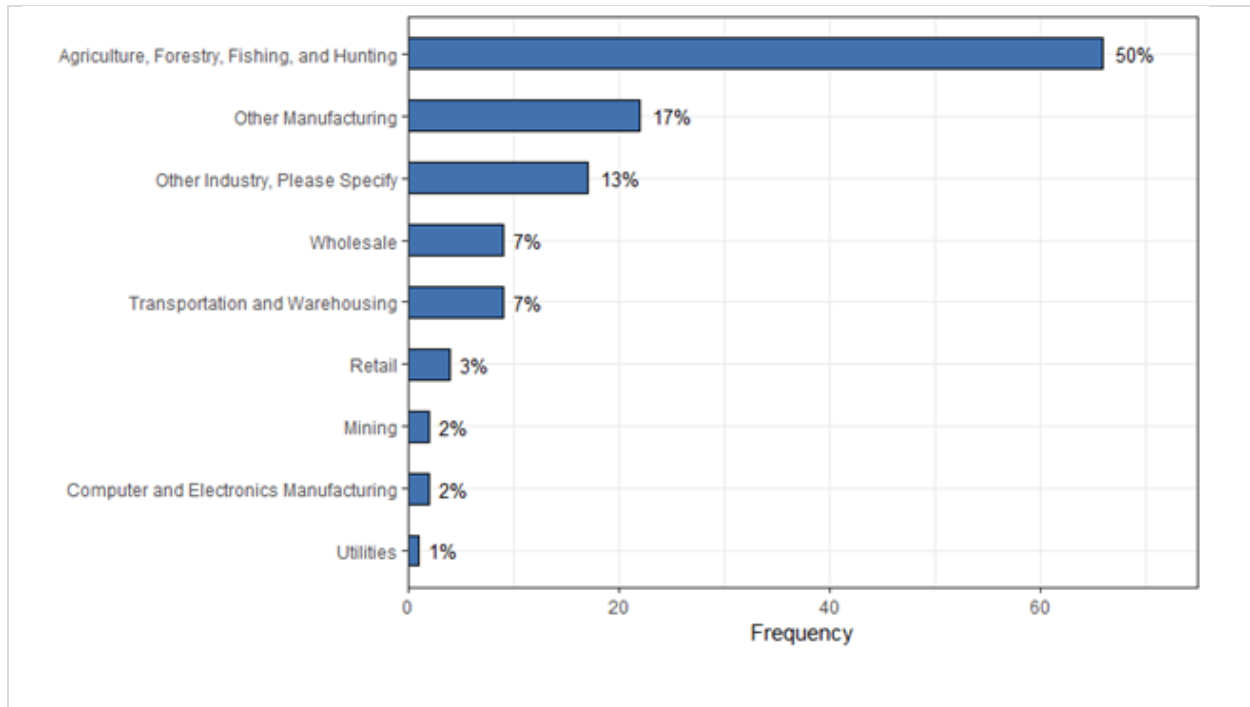


Figure 16. Distribution of Survey Respondents by Industry Type.

Of the various industry types, only the survey respondents from the Agriculture, Forestry, Fishing, and Hunting, Other Manufacturing, Other Industry, and Wholesale completed each question in the survey. As a result, responses only from these industries were summarized in the current Report.

Agriculture, Forestry, Fishing, and Hunting

The majority of facilities have been in their current location for several decades. The maximum capacity in terms of shipments was reported to be 300,000 tons, 3,500,000 hundredweight or centum weight (cwt), 8,000 gallons, 24,000,000 bushels, and 60,000,000 million-board-feet or greater, contingent on unit-type used by the facility. Considering storage capacity, facility representatives stated maximum storage capacities to be 215,000 tons, 100,000 cwt., and 2,000,000,000 board-feet.

Top commodities destined to the locations surveyed were reported to be grain and wheat products and wood products. Top commodities produced or shipped from the locations surveyed were reported to be potatoes and, grain and wheat products.

In terms of locations of origin for top commodities, majority are in the Idaho area, with origin locations also reported to be in Nevada and Utah. Of these shipments, the majority of facility representatives reported that these shipments were arriving from forests, farms, or storage shed/facilities. These inbound shipments are primarily delivered via rural interstates and state highways. The normal inbound truck shipment to these facilities was reported to be 40 tons per shipment, with the number of truck shipments varying by day, week, month, and year.

Regarding locations of destination, facility representatives reported different locations across the United States, ranging from Los Angeles, CA, to Seattle, WA, to Boston, MA. Of the outgoing shipments, the majority are headed to customers, with the primary routes being urban and rural interstates. Lastly, September to November were reported to be the times of year that inbound shipments most often arrive at these locations and the most often outbound shipments leave these locations.

Other Manufacturing

The majority of respondents reported their facility as being in its current location for 20 years or more (three reported more than 40 years). The maximum capacity in terms of shipments was reported to be 4,000 tons. Other unit-types were not reported. In terms of storage capacity, the maximum was reported to be 800 tons, 10,000 square feet, and 9,000,000 board-feet.

Each respondent reported a different top commodity in terms of inbound freight, as well as outbound freight. Locations of origin for inbound shipments were reported to be all over the United States (California to Pennsylvania), as well as worldwide (Japan and Australia). Inbound shipments were most often reported to be arriving from processing plants and warehouse or distribution centers. Routes used for inbound freight were evenly reported across state highways, U.S. highways, and interstates, with the normal truck shipment having a maximum of 40 tons.

Locations of destination of top commodities of outbound freight are Canada and the western United States. These outbound shipments are primarily headed to customers and warehouse or distribution centers. State highways and interstates were reported to be the most used routes for outbound truck shipments, in which the maximum normal outbound truck shipment was reported to be 21 tons. Akin to the Agriculture, Forestry, Fishing and Hunting industry, the majority of inbound and outbound shipments most often happen in the months of September to November.

Other Industry

The majority of respondents are in economic development or government. The facilities were reported to be in their current location from 1.5 years to 75 years. The maximum reported facility size in terms of shipments was 105 tons and the maximum reported storage capacity was 80,000 tons. Top commodities destined to these facilities and leaving these facilities varied by the type of industry specified. The locations of origin for incoming shipments were reported to be in the western United States, with shipments arriving from processing plants and warehouse or distribution centers. Normal truck shipment size for incoming freight was reported to be 34 tons. One respondent reported a frequency of incoming freight at 80,000 truckloads per year.

EROAD Truck Trip Data

Through a technology provider, a freight company can attach electronic logging/tracking devices or Global Positioning System (GPS) receivers on their trucks to manage their vehicle fleet. Using GPS equipment is a high-tech means to gather data on vehicle route information, vehicle speed, trip

distance, travel time, start/stop/idle time periods, and truck type frequencies on given corridors. An example of this technology provider is EROAD, which is utilized to collect data for this Report.

EROAD provides an in-vehicle electronic logging device (ELD) that can be used by drivers and fleet managers to monitor the drivers' hours of service. Drivers can log daily and weekly reports, as well as reports of on-duty status, rests and resets. All data are transmitted to a secure web portal, which help managers receive real-time notifications and access driver records. More information about this technology provider can be found in the [EROAD Website](#).

Truck trip data obtained from EROAD are analyzed to understand specific freight supply-chain characteristics common to each industry type. Industry types present in EROAD data include:

- Airports;
- Computer electronics;
- Hay producers;
- Hospitals;
- Meat processing;
- Potato processing;
- Sawmill;
- Transportation equipment manufacturing; and
- Warehousing and/distribution.

This Report will describe facility location by industry type, supply-chains that originate from facilities in Idaho, supply-chains that are destined to facilities in Idaho, supply-chains that run through Idaho, outbound freight shipments (freight leaving Idaho) by industry type, and inbound freight shipments (freight destined to Idaho) by industry type.

Idaho Facility Locations

Geospatial maps of facility locations are presented in figures 17 to 19. Highlights are provided below for each industry type.

- ***Airport***
There are eight airport locations in Idaho that are receiving and shipping freight. All but two of these airports are located adjacent to a major interstate.
- ***Computer Electronics***
There are 37 computer electronics facility locations in Idaho that are receiving and shipping freight. Once more, the majority of these facilities are located adjacent to major interstates.
- ***Hay Producers***
There are 74 hay producer facility locations in Idaho that are receiving and shipping freight. Of the hay producer facility locations, the majority are located in Southern Idaho.

- **Hospitals**
There are 43 hospital locations in Idaho that are receiving and shipping freight. The majority of hospitals in the EROAD data are located in Southern Idaho.
- **Meat processing**
There are 65 meat processing facility locations in Idaho that are receiving and shipping freight. As with the previous facility types, the majority of meat processing facilities are located in Southern Idaho.
- **Potato processing**
There are 12 potato processing facility locations in Idaho that are receiving and shipping freight. As with the previous facility types, the majority of meat processing facilities are located in Southern Idaho; specifically, adjacent to I-84.
- **Sawmills**
There are 76 sawmill facility locations in Idaho that are receiving and shipping freight. Unlike the previous facility types, the majority of sawmill facilities are located in Northern Idaho.
- **Transportation Equipment Manufacturing**
There are 89 transportation equipment manufacturing facility locations in Idaho that are receiving and shipping freight. These facility locations appear to be evenly distributed across Idaho.
- **Warehousing and Distribution**
There are 359 warehousing and distribution facility locations in Idaho that are receiving and shipping freight. Although the majority of these facilities are located in Southern Idaho, there is a larger proportion (compared to previous facility types) located in Northern Idaho.

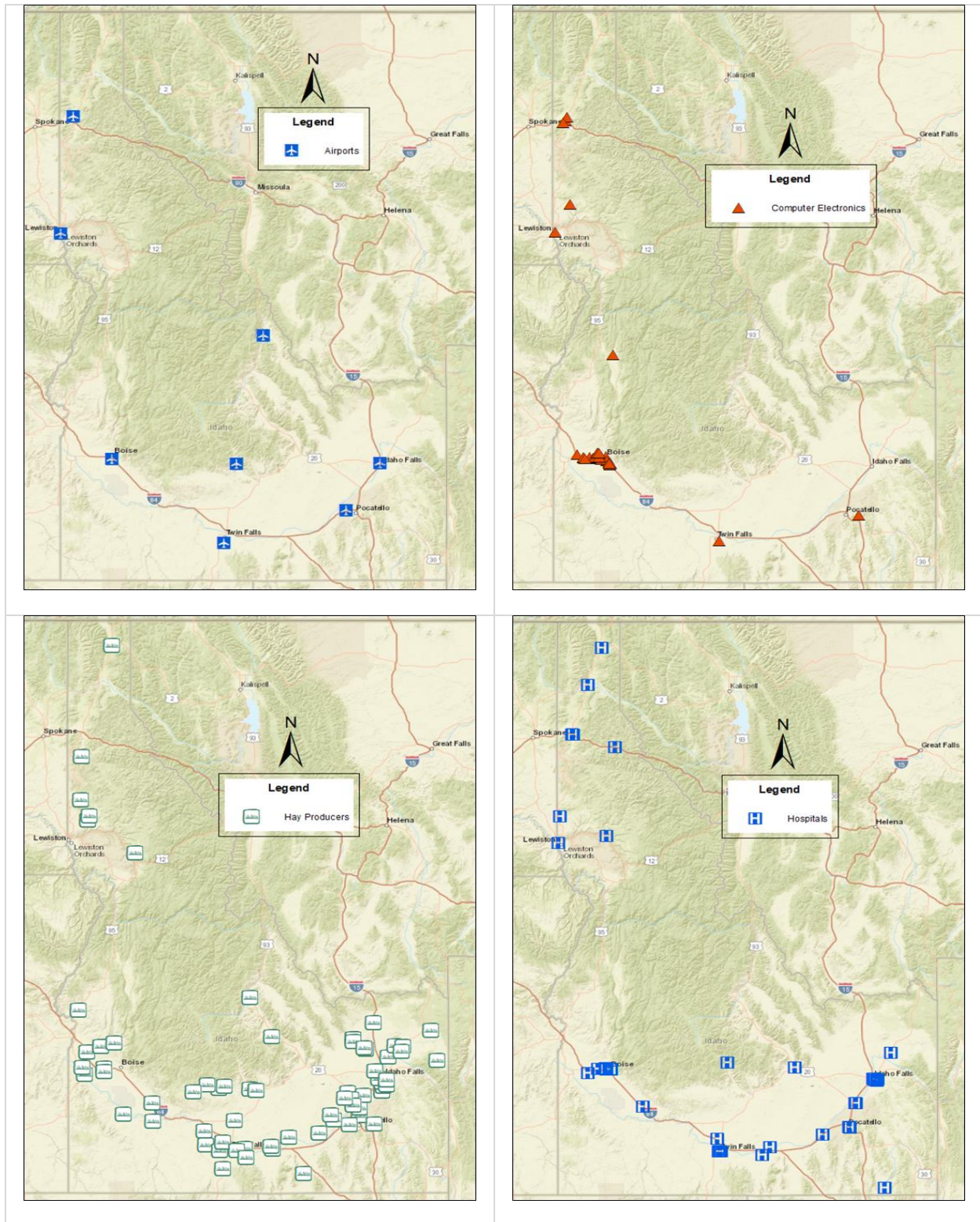


Figure 17. : Locations of Airports, Computer Electronics, Hay Producers and Hospitals in Idaho per EROAD Data.

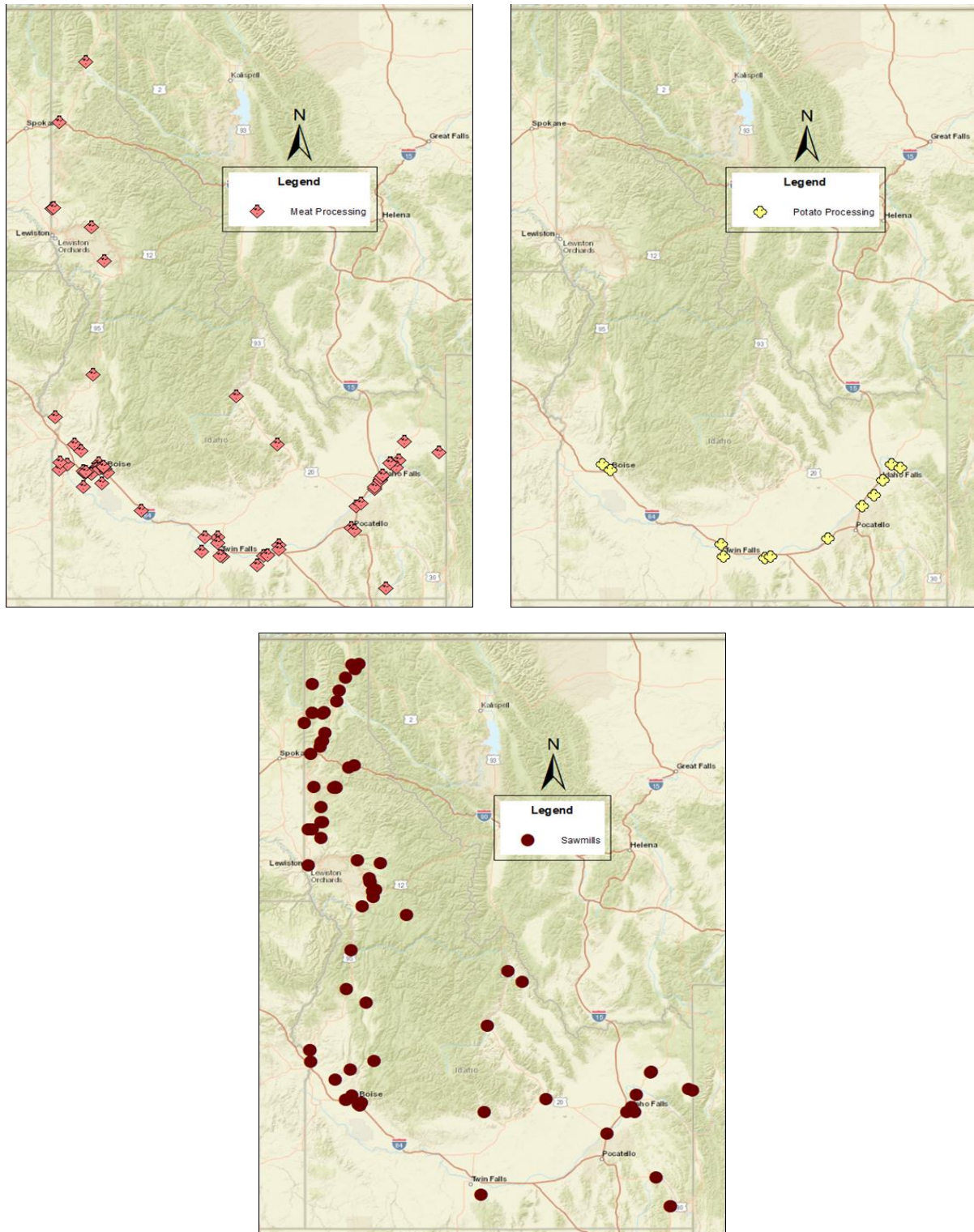


Figure 18. Locations of Meat Processing, Potato Processing and Sawmills in Idaho per EROAD Data.

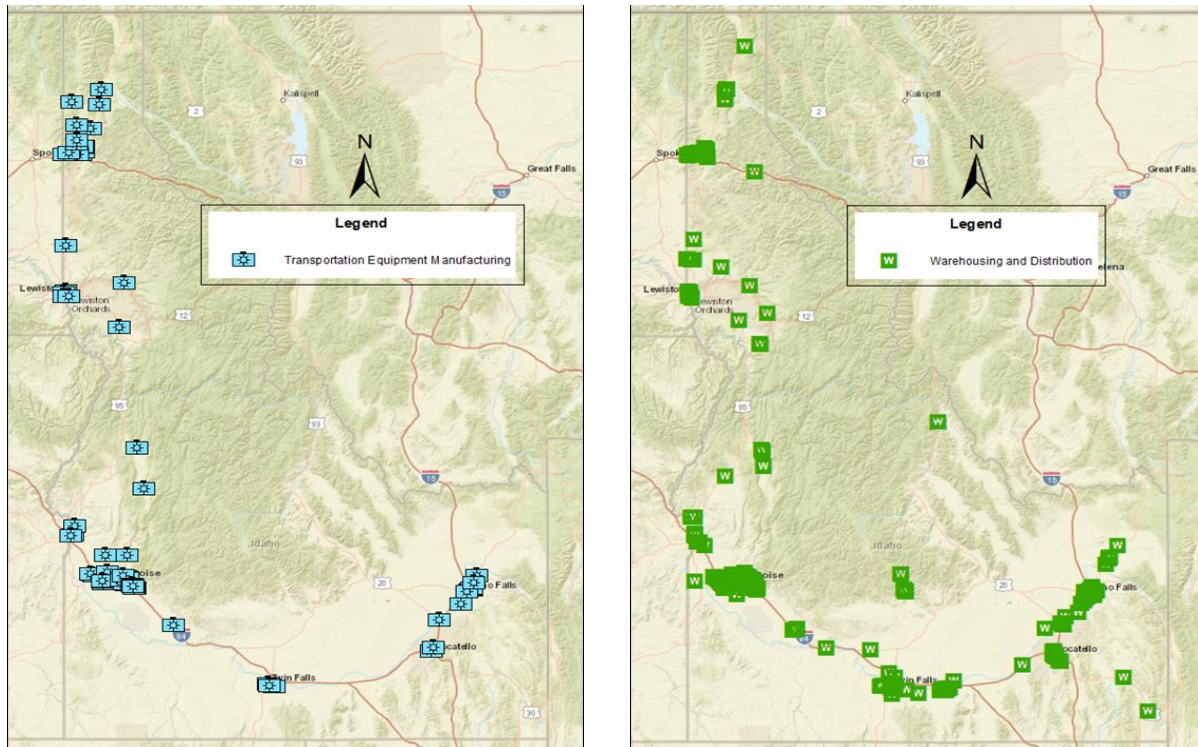


Figure 19. Locations of Transportation Equipment Manufacturing and Warehousing and Distribution in Idaho per EROAD Data.

Supply-Chains Originating from Facilities in Idaho by Industry Type

Summaries of data by industry type are given below and geospatial locations are presented in figures 20 to 24.

- ***Accommodation and Food Services***

This industry is originating from three distinct facility types: warehousing and distribution, sawmills, and meat processing facilities (figure 20). Of the shipments originating from these facilities, the average reported gross vehicle weight (GVW) is 35,905 pounds, the maximum is 50,000 pounds, the minimum is 32,000 pounds, and the standard deviation is 6,094 pounds

- ***Arts and Recreation Services***

According to EROAD data records, just one shipment is originating from a facility in Idaho, where the facility is a transportation equipment manufacturing facility (figure 20). The shipment is reported to be destined to Oregon and has a GVW of 51,000 pounds.

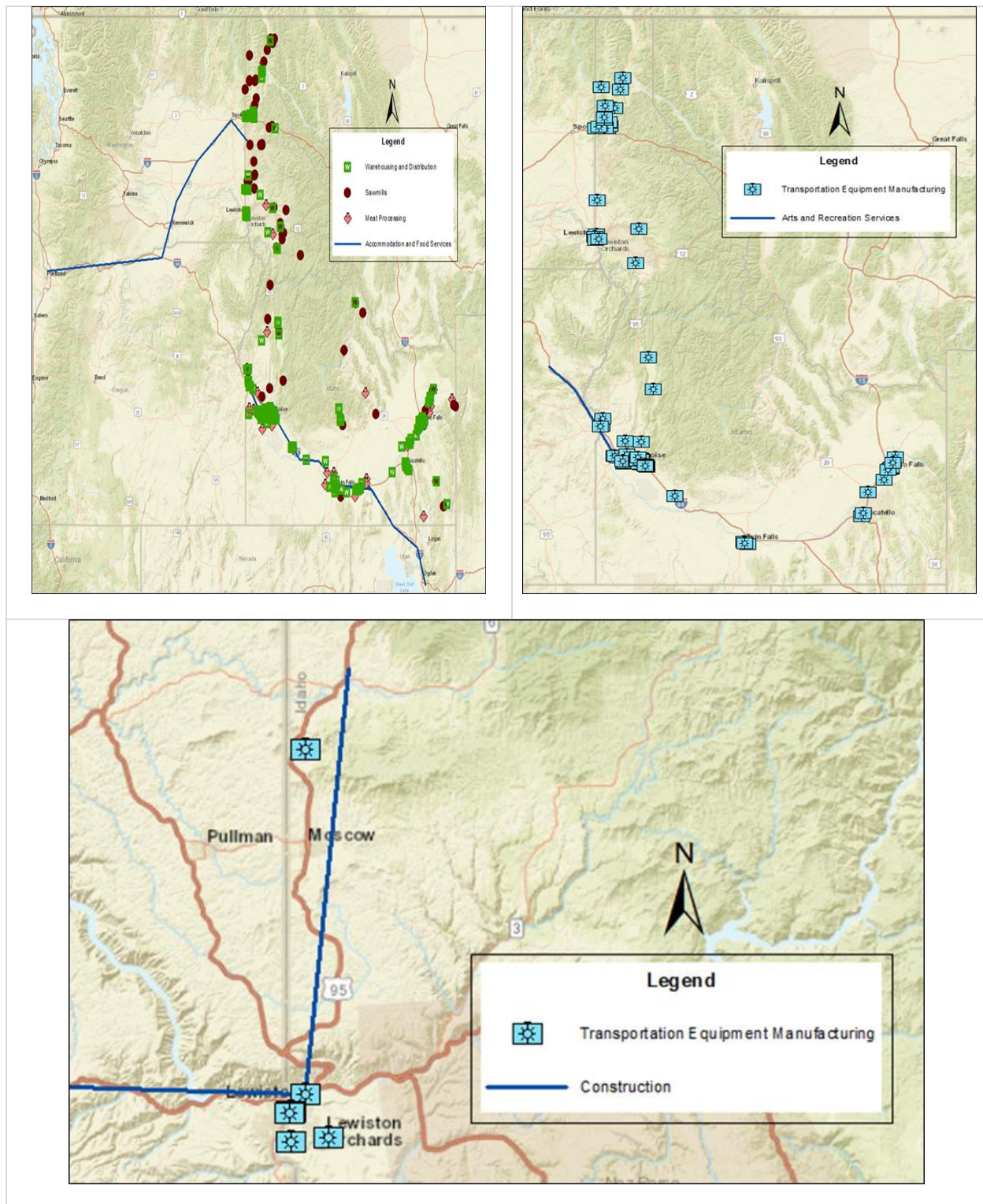


Figure 20. Shipments of Accommodation and Food Services, Arts and Recreation Services, and Construction Originating from Facilities in Idaho.

- **Construction**

There are only two data recorded (figure 20). One trip is destined to Idaho and the other to Washington. The shipment destined to Idaho has a GVW of 26,000 pounds, and the one destined to Washington has a GVW of 80,000 pounds.

- **Food, Beverage, and Tobacco Product Manufacturing**

There is only one record of shipment originating from a facility in Idaho. The origin is a warehousing and distribution facility and the shipment has a GVW of 80,000 pounds.

- **Forestry and Logging**

All recorded shipments are originating from facilities located in western Idaho (figure 21). The majority of forestry and logging shipments are originating from warehousing and distribution facilities, with some shipments originating from sawmills, computer electronics facilities, and transportation equipment manufacturing facilities.

- **General Freight**

General freight is originating from warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, potato processing facilities, meat processing facilities, and hospitals. Based on figure 21, these shipments are destined to Montana, Washington, Oregon, Utah, and Arizona. That average reported GVW for these shipments is 73,962 pounds. The maximum GVW is 105,500 pounds, the minimum is 26,000 pounds, and the standard deviation is 25,493 pounds.

- **General Haulage**

Shipments originating at Idaho facilities are shown in figure 21. All shipments are originating from warehousing and distribution facilities located in southern Idaho. The average GVW of shipments leaving these facilities is 84,000 pounds. The maximum GVW is 96,000 pounds, the minimum is 80,000 pounds, and the standard deviation is 6,928 pounds.

- **Other Agriculture**

Destinations include Oregon and Montana, with shipments originating in northern Idaho (figure 22). Shipments in EROAD records indicate a maximum recorded GVW of 95,500 and a minimum recorded GVW of 80,000.

- **Other Services**

Other Services shipments are originating from warehousing and distribution facilities, sawmills, and computer electronics facilities. As observed in Figure 22, the primary location of origin is western Idaho, with the destination being Idaho or Oregon. The average recorded GVW for Other Services shipments originating in Idaho facilities is 68,372 pounds. The maximum GVW is 90,000 pounds, the minimum is 14,000 pounds, and the standard deviation is 19,787 pounds.

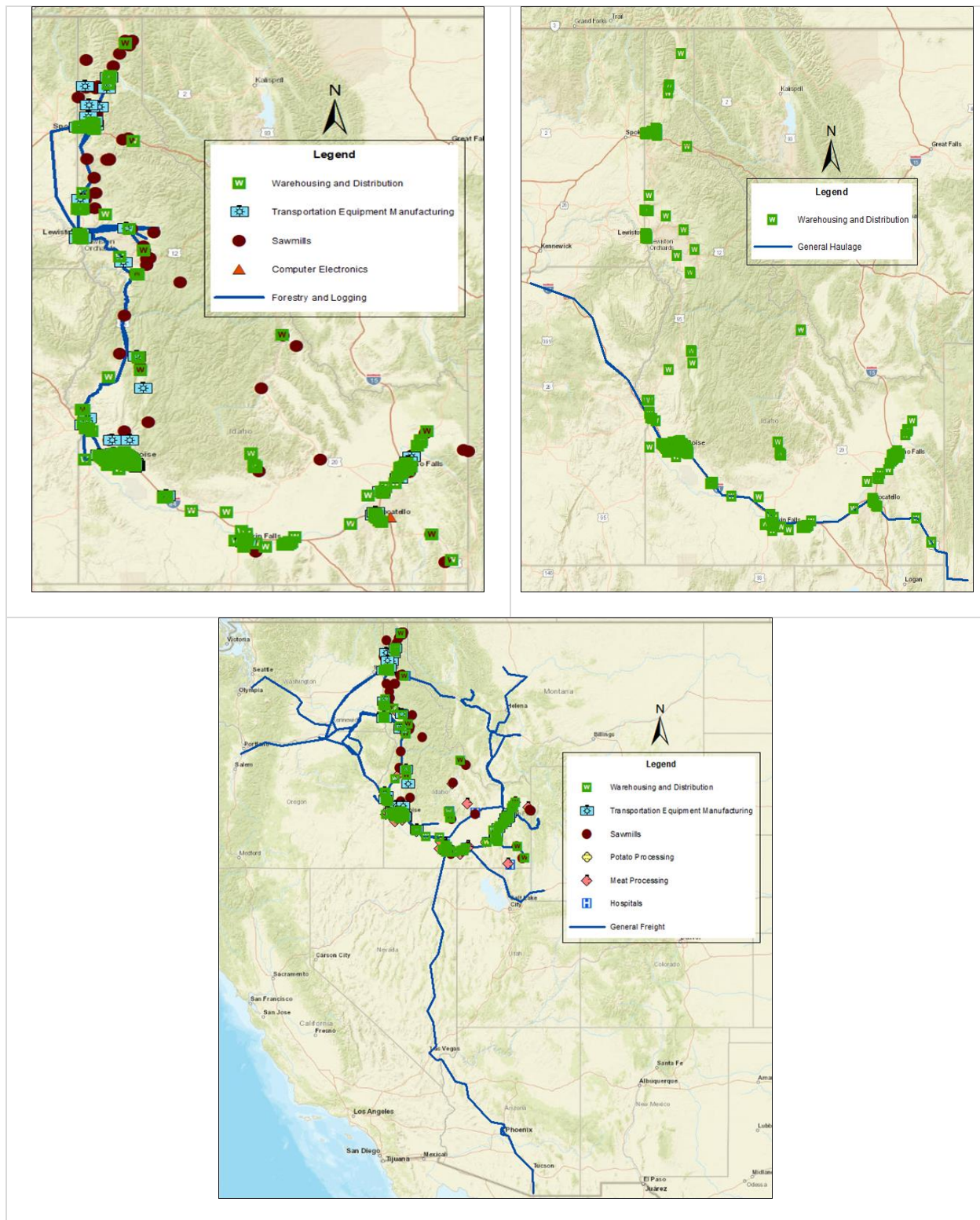


Figure 21. Shipments of Forestry and Logging, General Freight, and General Haulage Originating from Facilities in Idaho.

- **Private transport**

Shipments are destined to as far as Indiana and are originating from warehousing and distribution facilities located in western and southern Idaho (figure 23). The maximum recorded GVW is 80,000 pounds and the minimum recorded GVW is 46,000 pounds (only two observations are provided in the EROAD data records for this industry type).

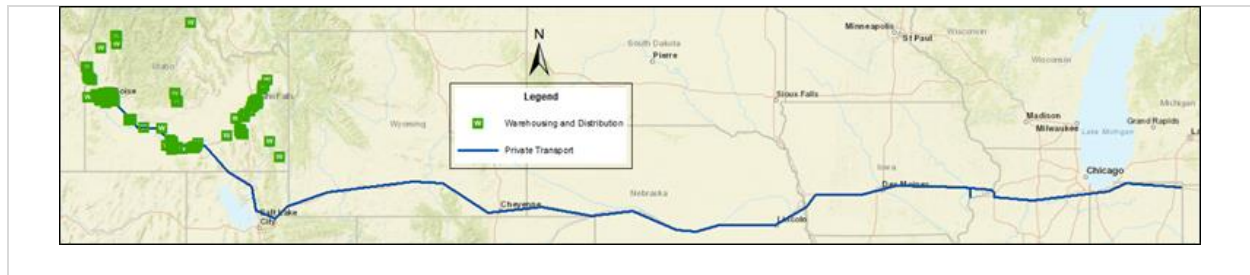


Figure 23. Private Transport Shipments Originating from Facilities in Idaho.

- **Steel and aluminum**

Steel and aluminum industry shipments are destined primarily to Utah, with some shipments destined to within Idaho and some to Oregon (figure 24). Also, these shipments originate in warehousing and distribution facilities or transportation equipment manufacturing facilities. Of the records provided by EROAD, the maximum recorded GVW for these shipments is 46,000 pounds and the minimum recorded GVW is 32,000 pounds.

- **Transport equipment, machinery and equipment manufacturing**

Shipments for this industry are from warehousing and distribution facilities and transportation equipment manufacturing facilities located in western and southern Idaho (figure 24). Destinations include other facilities in Idaho, Oregon, and Utah. Recorded GVW for outbound shipments indicates an average GVW of 80,000 pounds, a minimum GVW of 51,000 pounds, a maximum GVW of 105,500 pounds, and a standard deviation of 21,047 pounds.

- **Wood and paper products manufacturing**

This industry, according EROAD data records, are shipping goods from warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, and meat processing facilities. Referring to Figure 24, the shipments originating in northern Idaho are destined to Oregon, while the shipments originating in southern Idaho are being shipped within state.

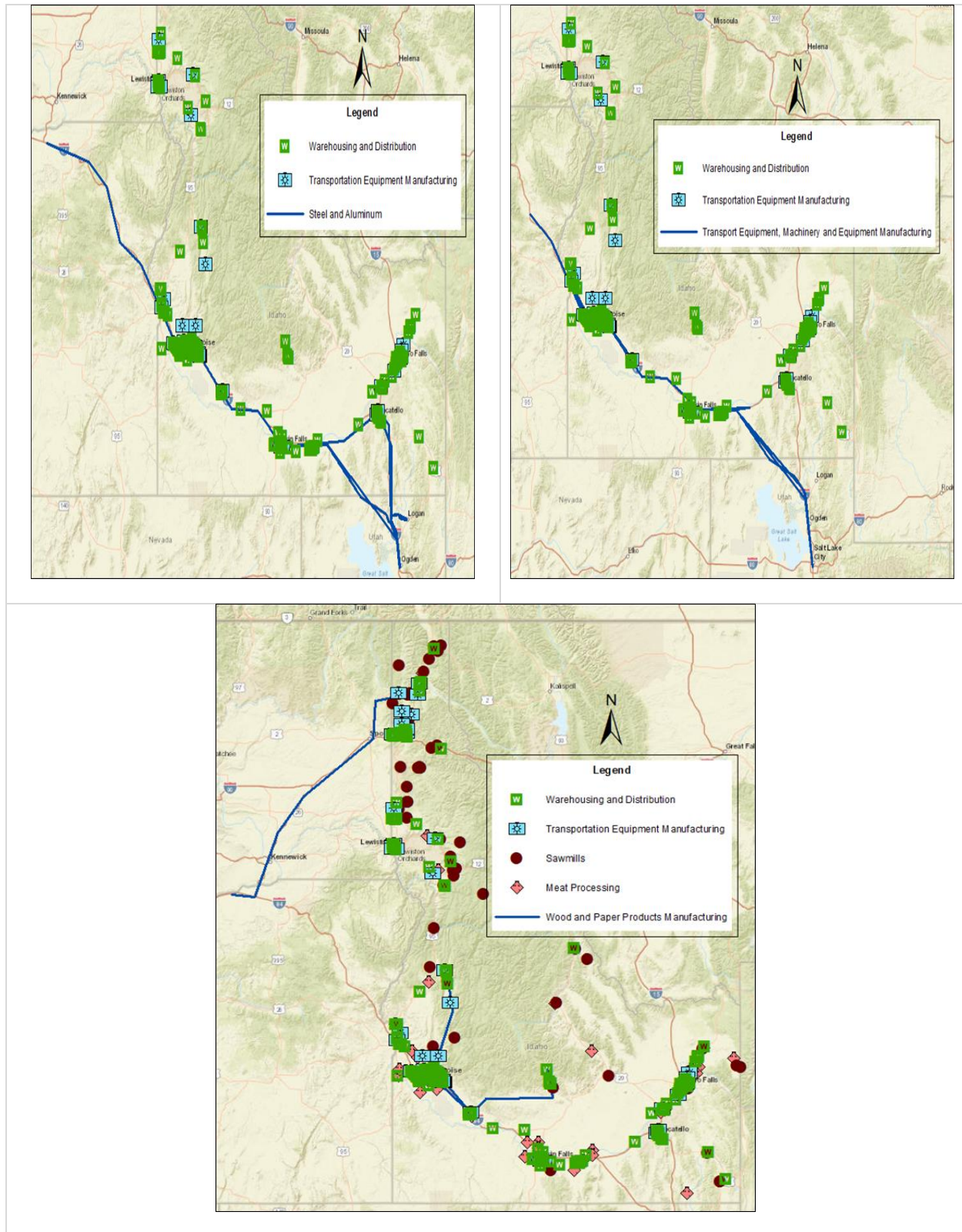


Figure 24. Shipments of Steel and Aluminum, Transport Equipment, Machinery and Equipment Manufacturing, and Wood and Paper Products Manufacturing Originating from Facilities in Idaho.

Supply-Chains Destined to Facilities in Idaho by Industry Type

Summaries of data by industry type are given below and geospatial locations are presented in figures 25 to 29.

- **Accommodation and food services**

Nearly all of the shipments are headed to facilities in southern Idaho, with one headed to a facility in northern Idaho (figure 25). The facility types receiving these goods include warehousing and distribution facilities, sawmills, and meat processing facilities. From EROAD records, the average GVW destined to these facilities is 36,737 pounds, the maximum is 50,000 pounds, the minimum is 32,000, and the standard deviation is 6,231 pounds.

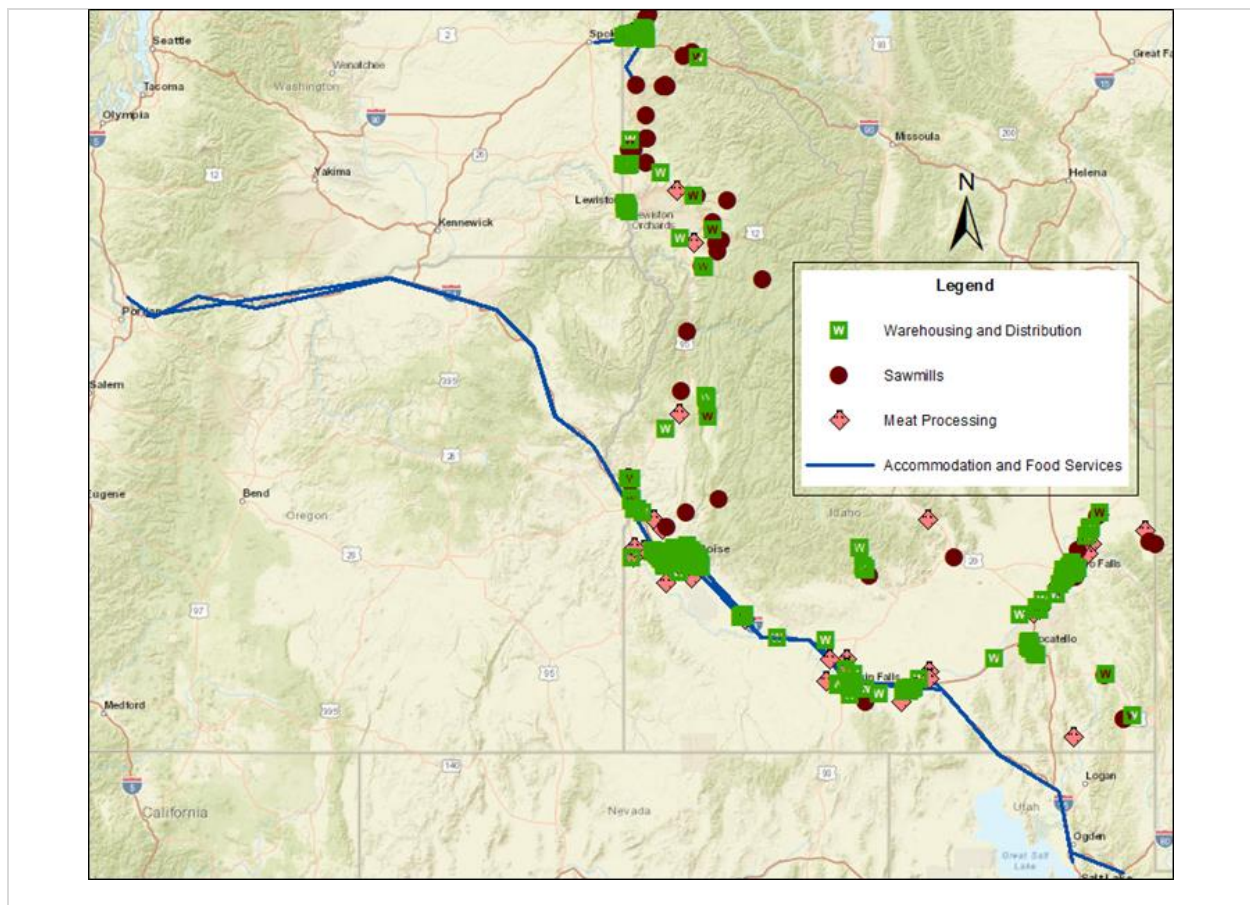


Figure 25. Shipments of Accommodation and Food Services Destined to Facilities in Idaho.

- **Arts and recreation services**

Just one EROAD record contains an arts and recreation services shipment to a facility in Idaho (figure 26). This shipment is originating in Utah, destined to a transportation equipment manufacturing facility, and has a recorded GVW of 51,000 pounds.

- **Construction**

Figure 26 shows the two EROAD records of construction shipments destined to facilities in Idaho, both of which are headed to transportation equipment manufacturing facilities near northern Idaho. One facility is receiving goods from Washington, where the incoming shipment has a recorded GVW of 26,000 pounds. The other incoming shipment is from within Idaho and has a recorded GVW of 80,00 pounds.

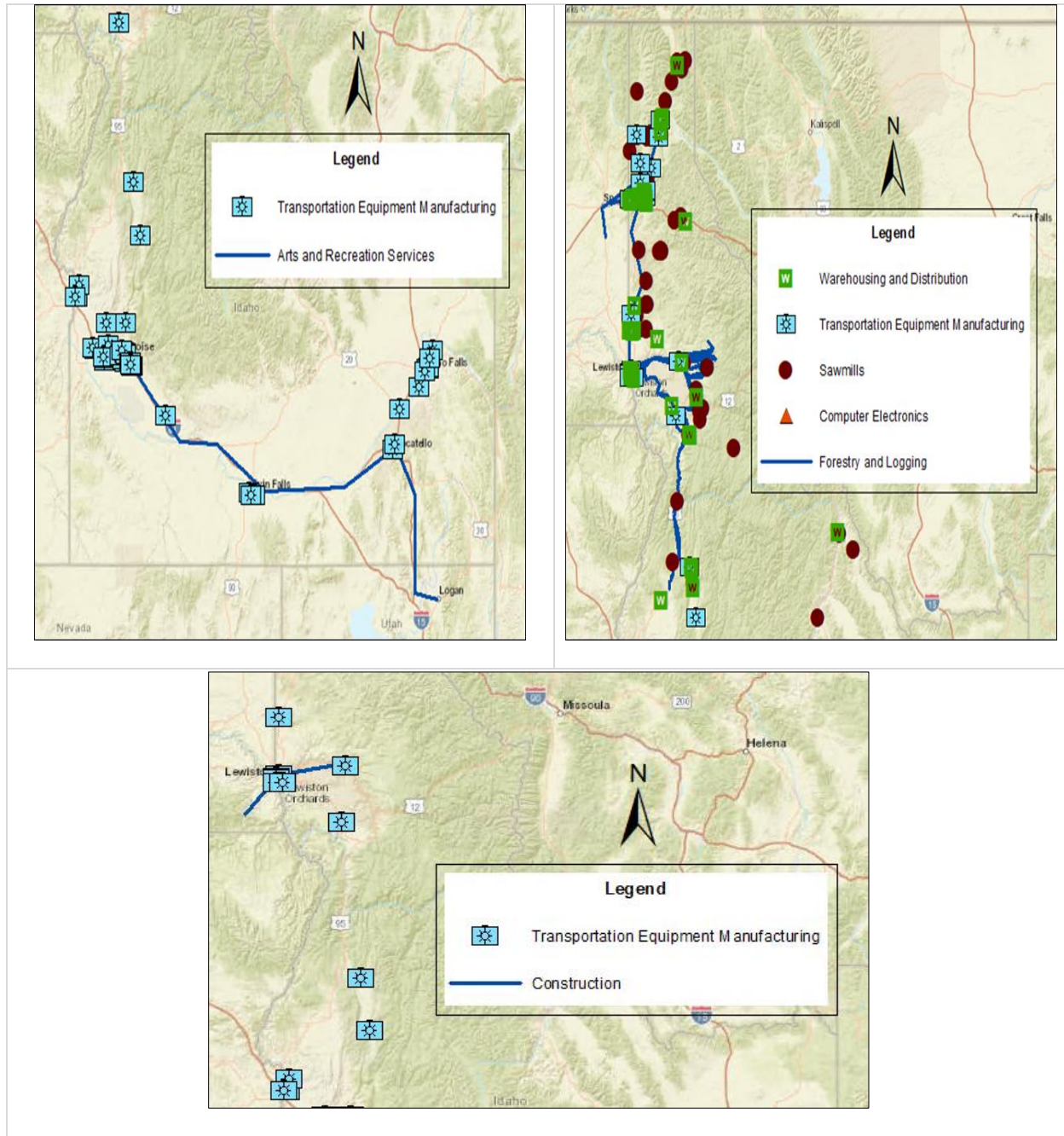


Figure 26. Shipments of Arts and Recreation Services, Construction, and Forestry and Logging Destined to Facilities in Idaho.

- ***Food, beverage, and tobacco product manufacturing.***

The single record for this industry type is destined to a warehouse and distribution facility in Idaho, shipped from within Idaho, and has a recorded GVW of 80,000 pounds.

- ***Forestry and logging***

Facilities receiving goods from this industry include warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, and computer electronics facilities (figure 26). All of these shipments are originating from and destined to facilities located in northeastern Idaho, with one shipment originating from Washington. The mean value GVW for these shipments is 84,895 pounds, the maximum is 105,500 pounds, the minimum is 80,000 pounds, and there is a standard deviation of 9,540 pounds.

- ***General freight***

General freight shipments are headed to a variety of facility types, including warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, potato processing facilities, meat processing facilities, and computer electronics facilities (figure 27). The majority of these shipments are destined to warehousing and distribution facilities. Furthermore, locations of origin for these incoming shipments include Oregon, Montana, Wyoming, California, Utah, and Idaho. The mean GVW value is 73,750 pounds, maximum of 105,500 pounds, minimum of 17,000 pounds, and a standard deviation of 25,850 pounds.

- ***General haulage***

In the EROAD records, there are two shipments, both originating from and destined to Idaho. Also, both are headed to a warehousing and distribution facility, and both have a recorded GVW of 80,000 pounds.

- ***Other agriculture***

Figure 27 shows the warehousing and distribution facilities in Idaho where other agriculture shipments are destined to. Of the three records, two are originating from Oregon and one from Washington. The recorded GVW for the shipments originating from Oregon are 105,500 pounds and 80,000 pounds, while the recorded GVW for the shipment originating from Washington is 95,500 pounds.

- ***Other services***

Other services shipments destined to Idaho facilities, in particular, warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, and computer electronics facilities. Locations of origin for these shipments include Washington, Oregon, and Idaho. The mean recorded GVW is 66,000 pounds. The maximum is 90,000 pounds, the minimum is 14,000 pounds, and the standard deviation is 23,425 pounds.

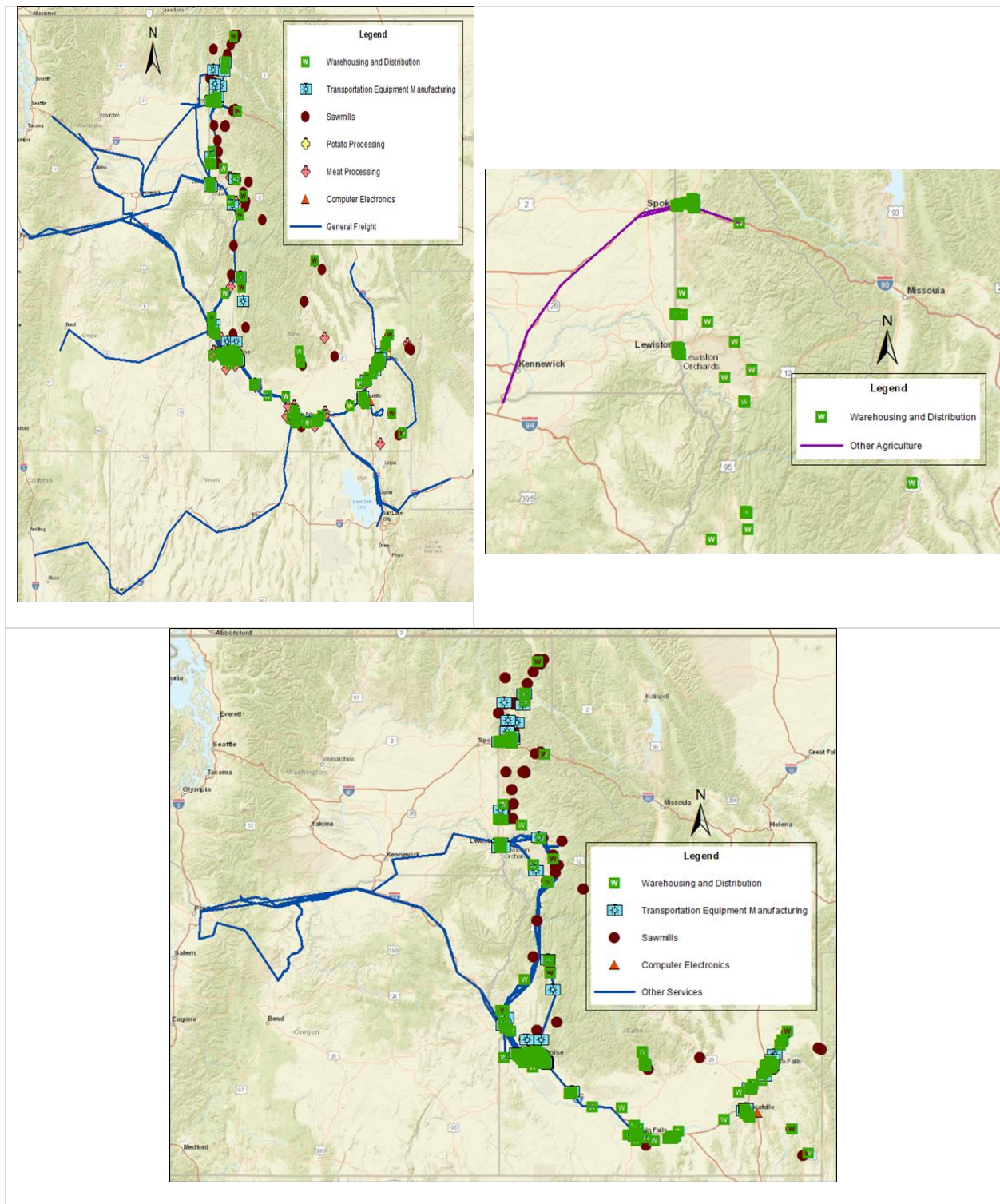


Figure 27. Shipments of General Freight, Other Agriculture, and Other Services Destined to Facilities in Idaho.

- **Private transport**

Private transport shipments destined to warehousing and distribution facilities in Idaho are shown in figure 28. One of the shipments is originating within Idaho and the second shipment is originating in Utah. The Idaho shipment has a recorded GVW of 46,000 pounds and the Utah shipment has a recorded GVW of 80,000 pounds.

- **Refrigerated haulage**

The single EROAD record for refrigerated haulage is destined to a warehousing and distribution facility in Idaho, originating from Idaho, and has a recorded GVW of 56,000 pounds.

- **Steel and aluminum**

Figure 28 shows the steel and aluminum shipments destined to warehousing and distribution facilities, and transportation equipment manufacturing facilities in Idaho. One of the shipments is incoming from Washington, while the remaining shipments are originating from and destined to Idaho. According to EROAD records, the mean recorded GVW is 43,667 pounds, the maximum is 46,000 pounds, the minimum is 32,000 pounds, and the standard deviation is 5,218 pounds.

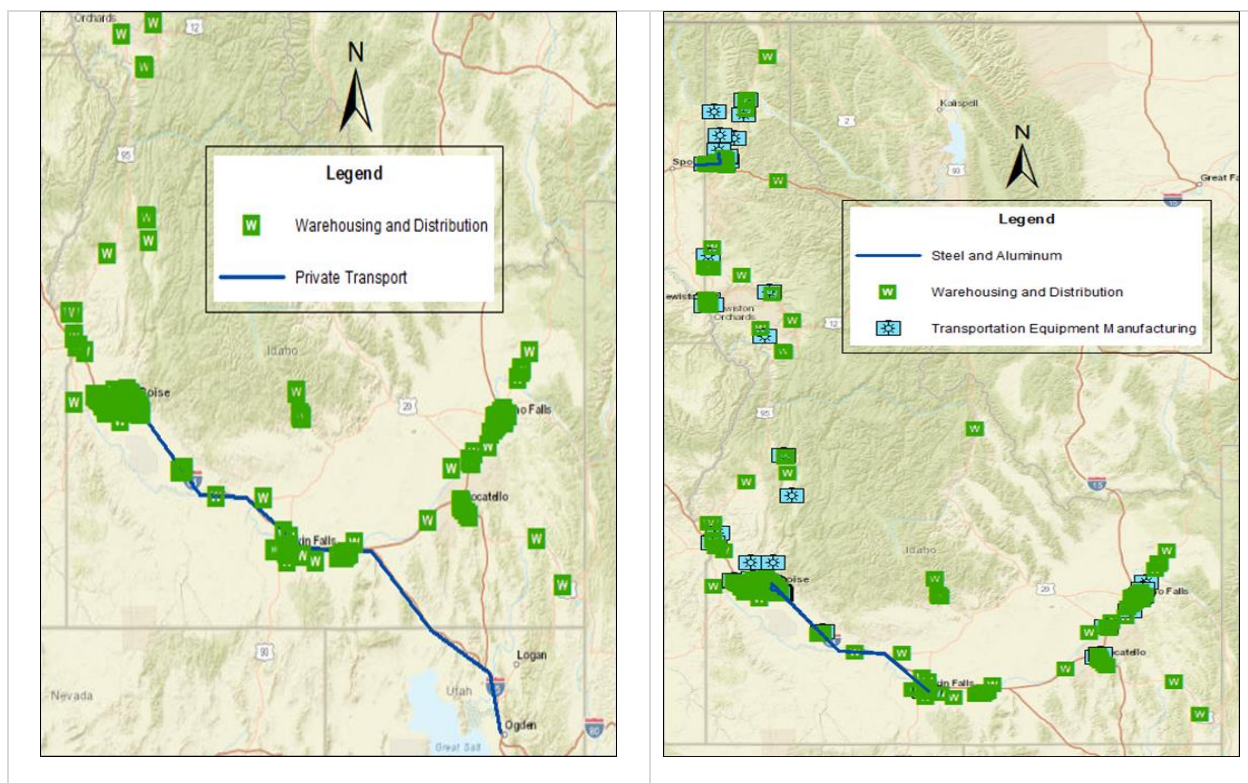


Figure 28. Shipments of Private Transport, and Steel Aluminum Destined to Facilities in Idaho.

- **Transport equipment, machinery and equipment manufacturing**

Shipments destined to facilities in Idaho, in particular, warehousing and distribution facilities and transportation equipment manufacturing facilities are shown in figure 29. Shipments come from Washington, Utah, Oregon, and Idaho. The mean GVW is 81,605 pounds. The maximum is 105,500 pounds, minimum is 51,000 pounds, and standard deviation is 20,103 pounds.

- **Wood and paper products manufacturing.**

Shipments are destined to facilities in Idaho including warehousing and distribution facilities, transportation equipment manufacturing facilities, sawmills, meat processing facilities, and computer electronics facilities. Shipments originate from Washington, Oregon, Wyoming, Montana, and Idaho (figure 29). The mean recorded GVW for these shipments is 96,405 pounds, a maximum GVW of 105,500 pounds, a minimum GVW of 28,000 pounds, and a standard deviation of 18,156 pounds.

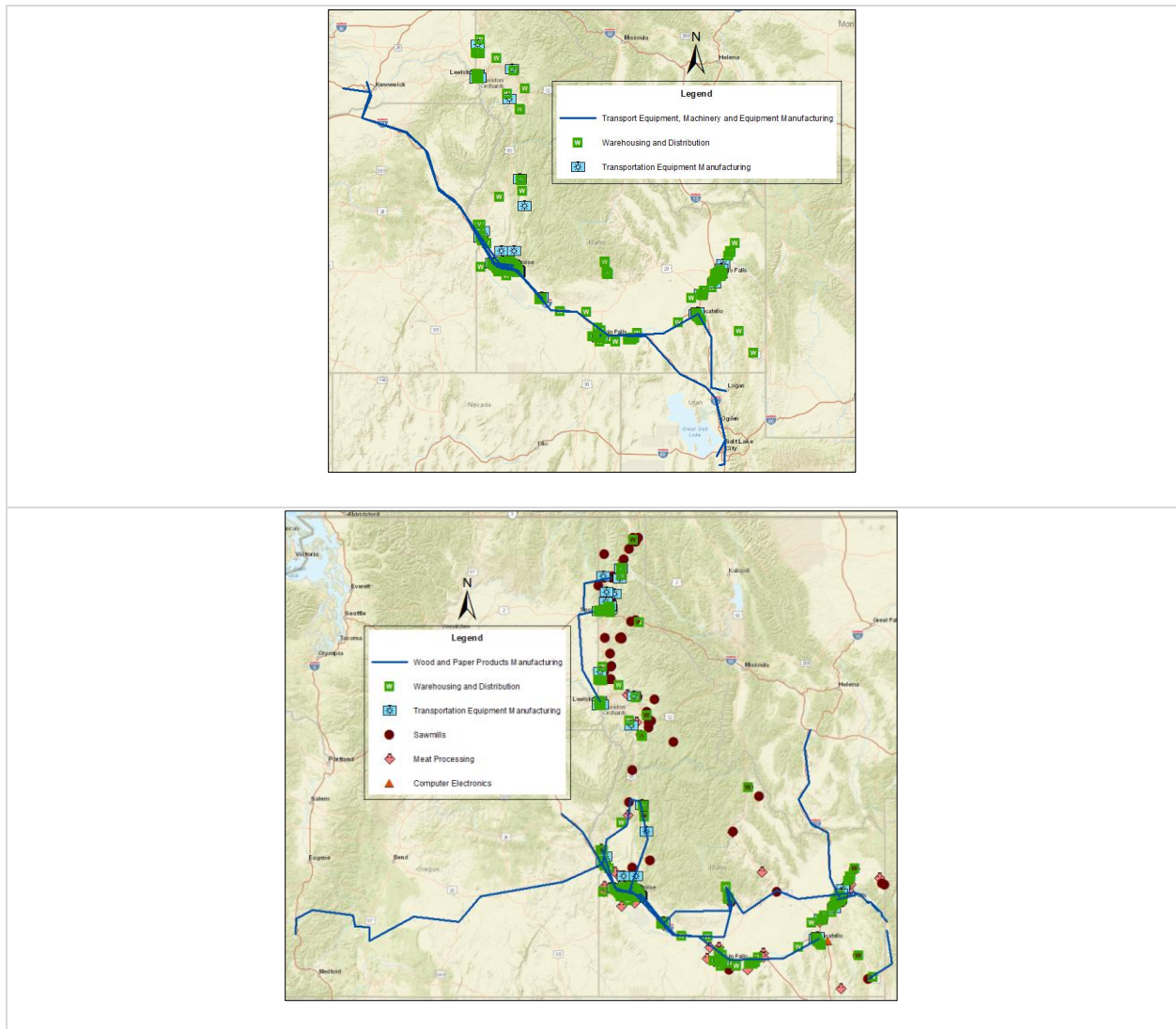


Figure 29. Shipments of Other Agriculture, and Other Services Originating from Facilities in Idaho.

Chapter 4: Summary and Discussion

This study focused on identifying the freight characteristics and attributes of important economic supply chains for the state of Idaho. Compiling and analyzing freight data and information from a variety of sources can help illuminate freight movements within regional and state boundaries and help identify those attributes and characteristics unique to individual supply chains. An understanding of these unique aspects then allows for more efficient future investments (public infrastructure) that support those supply chains on which the regional and state economy depend and additionally provides greater awareness of the relationship between transportation efficiency and economic performance.

It is often challenging to find one data source or even a combination of sources that provides the necessary data details for all freight types and supply chain activities. This primarily illustrates the complexity of different freight activities, moving from production to processing and distribution for each of the key industries across the state. In this study, a combination of truck GPS sensor data (EROADs) and freight surveys to establishments located within Idaho were compiled. Both sources of information have limitations in terms of coverage for freight supply chain activities but both avenues also provide a greater understanding of unique aspects of each supply chain that is difficult to obtain otherwise.

The EROAD data provided very good trip specific information for vehicles with transponders but many freight activities within the state of Idaho are conducted by trucks that do not have the EROAD devices. This includes most agricultural, forest products and resource-based commodities that are originating from farms, grain elevators, fields, mines and forests for the first portion of transportation activities comprising each supply chain. In many cases, these freight trucks are owned and operated by independent or owner-operated firms for which installing GPS transponders makes little economic sense given that the marginal benefit from increased information related to fleet utilization is relatively small compared to the cost of installation when only one or two vehicles are in operation. Commercial truck operations with many vehicles are more likely to have these devices and thus freight information is more readily available from freight movements utilizing these services.

The establishment surveys were primarily targeted to those industries which had limited EROAD data coverage, but the response rates across these industry types was relatively low. As a result, the data and information obtained via this avenue was also limited. The primary findings resulting from this multi-channel data compilation approach includes the following:

- Agricultural and resource-based freight activities are more geographically diverse and linked to those regions where production activity is concentrated. The characteristics of this type of movement from fields, farms and forests are relatively short distance truck trips to processing facilities that possess wide seasonal fluctuations associated with the production characteristics of the crop produced. Many of these trips originate on roads and highways that are not primary

freight corridors and often under the jurisdiction of local cities/counties to maintain. Given that these movements are relatively short distance and seasonally tied to production, information regarding these freight activities can be informed from data related to production and location of processing activities (USDA, Idaho Department of Agriculture). Information related to trip details is not necessarily critical given that the trips are generally to the closest processing facility (grain to grain elevator, potato to cold storage or processing plant, hay to broker, timber to sawmills, etc.) Public investments that facilitate greater efficiencies for this freight activity should focus on maintaining access and capacity (weight limits) connecting these production locations and limiting closures (highway construction) during peak harvest or seasonal freight activity. These improvements will benefit the producers most directly, allowing greater access and efficiency to markets.

- The agricultural and resource-based processing facilities are more concentrated near major transportation corridors (often multi-modal) due to the need to distribute year-round, even as inbound product is seasonal. The outbound/distribution freight activity from these processing facilities is much longer trips to markets far beyond the state borders thus requiring the cost efficiencies associated with rail or barge, in addition to the dependable service attributes of truck. Freight volumes leaving these processing facilities are influenced by a wider array of factors outside the state as these products compete in domestic and international markets. The export component is linked with the ocean ports at Seattle/Tacoma, WA and to a lesser degree the ports in Oakland, CA whereas the domestic markets are primarily urban centers in the west (Salt Lake City, UT, Seattle, WA, Portland, OR, Denver, CO). Improved efficiencies for the outbound component of agricultural processing facilities can include:
 - State incentives and partnerships with Class I railroads in developing inland container terminals that provided better access to ocean ports and shipping containers. This could benefit processed potatoes, hay, high-value grain specifically. The selection of the location is critical in order to generate large enough scale across multiple products to appeal to the Class I railroad interest.
 - Aligning of truck weight limits with neighboring states and those connected via these freight supply chains so that processors don't have to load to the lowest state limits through which they travel.
- Manufacturing/warehouse distribution centers are primarily concentrated around Boise/Nampa, Twin Falls and Idaho Falls along I-84, I-15 and I-86 and differ from the freight needs of the agricultural and resource based industries in that large volumes of both inbound/outbound shipments require transportation that is consistent, dependable, resilient and accessible at all times. This is primarily due to the greater importance of timing in warehouse/distribution activities and manufacturing processes that are expensive to start/stop. Given that timing is more critical, maintaining adequate truck parking along this I-84, I-86, I-15 corridor is important for deliveries that must be within narrow windows, particularly for long-haul truck shipments where drivers are more likely to face hours of service limits.

- EROAD data may be evaluated in more granular detail for those high-value, time-sensitive, consistent shipping volume products where enhanced understanding regarding impediments (congestion points) to efficient freight movement is desired. This analysis didn't focus in at that level, but identification of where trip delays are occurring or and determining how to address these transportation inefficiencies is something that EROAD information allows.
- Partnering with a technology provider in the future (EROAD or another similar firm) may be an efficient way to obtain the necessary information on specific freight supply chain activities.

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Appendix A: Idaho Agricultural Production Locations

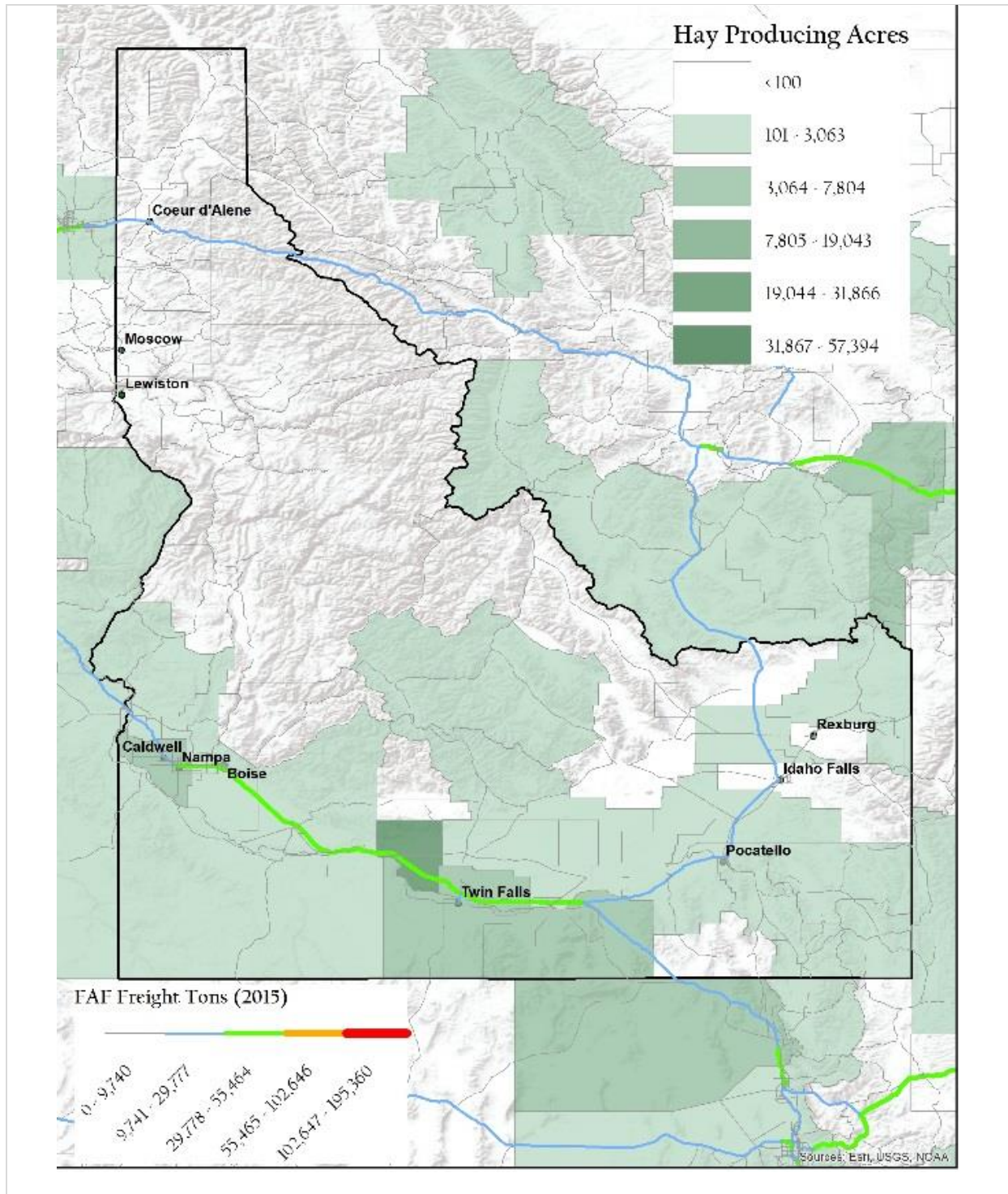


Figure 30. Idaho Hay Production, by County, 2016

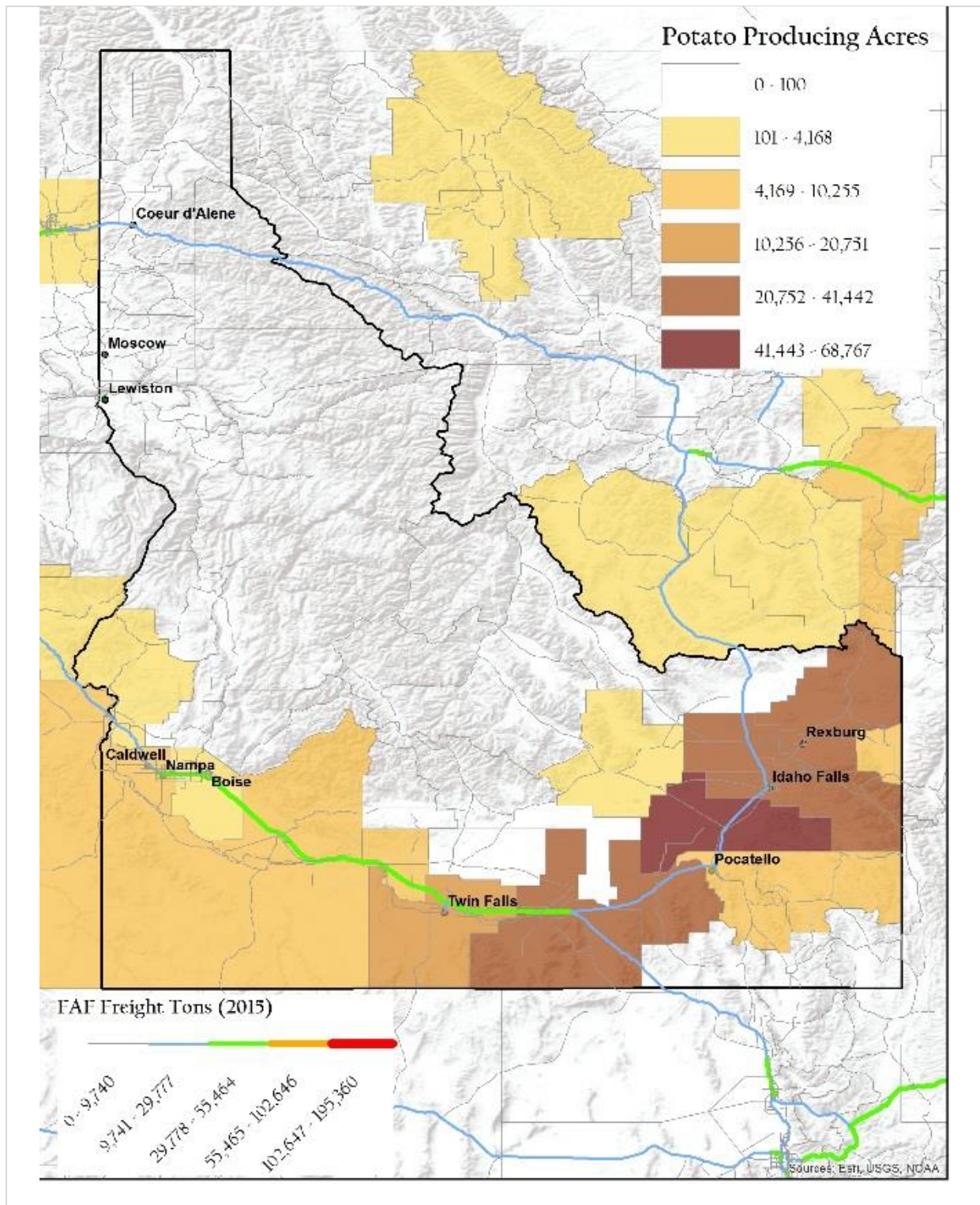


Figure 31. Idaho Potato Production, by County, 2016

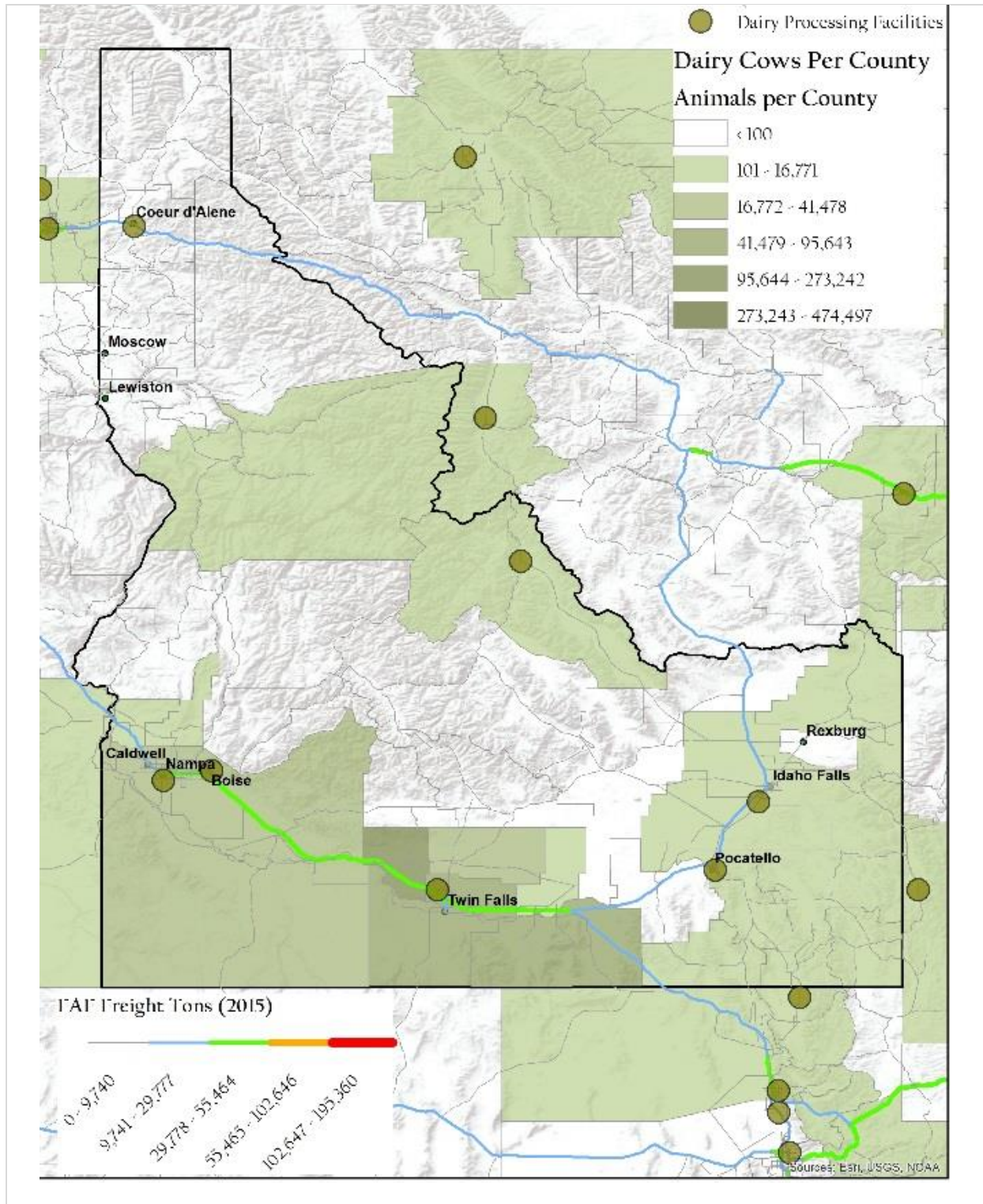


Figure 32. Idaho Dairy Cows, by County, 2016

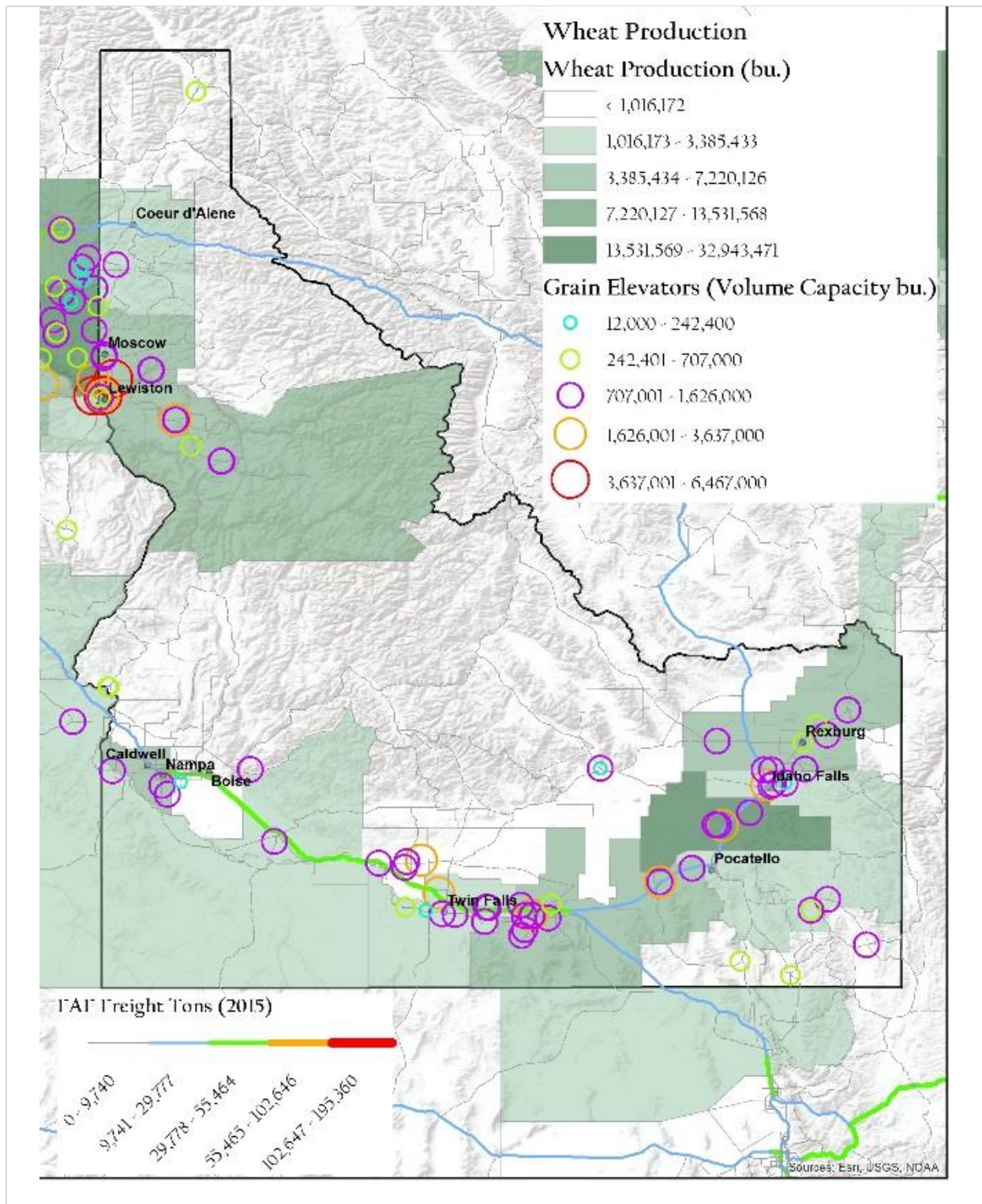


Figure 33. Idaho Wheat Production, by County, 2016

Appendix B: Survey Questionnaires

Establishment Survey Questionnaire

FACILITY INFORMATION

Q1. How long has this facility been at its current location?

_____ years

Q2. How large is your facility?

_____ **Total Amount of Annual Units Shipped** *(please check the type of unit for this facility)*

☐₁ Tons ☐₂ Cwt. ☐₃ Gallons ☐₄ Bushels ☐₅ Other (specify): _____

_____ **Total Amount of Storage Capacity**

☐₁ Tons ☐₂ Cwt. ☐₃ Gallons ☐₄ Bushels ☐₅ Other (specify): _____

Q3. How many facilities such as this one does your firm own and/or operate? _____

Q4. How many employees (including yourself) work at this facility? _____

Q5. What is the primary commodity you receive at this facility? _____

Q5b. What other commodities do you receive at this location? _____

Q6. What is the primary commodity you produce/ship from this facility? _____

Q6b. What other commodities do you ship from this location? _____

Q7. At this location, do you have loading / unloading capabilities for...

	Yes ▼	No ▼
a. Trucks	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
b. Rail Cars	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂
c. Barges	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂

FREIGHT SHIPMENTS

Please complete the table below for your other inbound and outbound freight shipments.

Q8. Location where inbound/outbound shipments originate and end up?

Inbound Freight	Outbound Freight
_____ city _____ state	_____ city _____ state
_____ city _____ state	_____ city _____ state
_____ city _____ state	_____ city _____ state
_____ city _____ state	_____ city _____ state

Q9. What type of transportation modes would be used for this shipment?

Inbound Freight		Outbound Freight	
Mode (Check if used)	Distance traveled	Mode (Check if used)	Distance traveled
▼	▼	▼	▼
<input type="checkbox"/> Truck	_____ miles	<input type="checkbox"/> Truck	_____ miles
<input type="checkbox"/> Rail	_____ miles	<input type="checkbox"/> Rail	_____ miles
<input type="checkbox"/> Barge	_____ miles	<input type="checkbox"/> Barge	_____ miles

Q10. What type of facility is this shipment arriving from and going to?

Inbound Freight		Outbound Freight	
<input type="checkbox"/> 1 Warehouse/DC	<input type="checkbox"/> 2 Customer	<input type="checkbox"/> 1 Warehouse/DC	<input type="checkbox"/> 2 Customer
<input type="checkbox"/> 3 Rail terminal	<input type="checkbox"/> 4 Processing Plant	<input type="checkbox"/> 3 Rail terminal	<input type="checkbox"/> 4 Processing Plant
<input type="checkbox"/> 5 Other (specify): _____		<input type="checkbox"/> 5 Other (specify): _____	

Q11. Describe the highway route used for inbound / outbound truck shipments?

Inbound Freight	Outbound Freight
_____	_____
_____	_____
_____	_____
_____	_____

Roadside Survey Questionnaire

Interviewer Name: _____: Location of Interview:

Time of Interview: _____ AM or PM

Q1. Is this truck loaded? ☐₁ Yes ☐₂ No ☐₃ Partially

Q1b. Estimated Payload Weight? _____ lbs. or tons.

Q2. What is the primary commodity? _____

Q3. Please identify the vehicle configuration (can be conducted by interviewer beforehand):

Q4. Please identify the location where the shipment originated and the location of the destination, along with the route used:

Truck Configuration

Check only one truck configuration

1. ☐ Straight Truck
2. ☐ Straight Truck & Trailer
3. ☐ Tractor Only
4. ☐ Tractor & One Trailer
5. ☐ Tractor & Two Trailers
6. ☐ Other:

Trailer Style

Check all that apply

1. ☐ Van Without Temp Control
2. ☐ Van With Temp Control
3. ☐ Flatbed
4. ☐ Car Carrier
5. ☐ Hopper or Belly Dump
6. ☐ Stake & Rack
7. ☐ Concrete
8. ☐ Tanker
9. ☐ Float or Low Boy
10. ☐ Dump
11. ☐ Container
12. ☐ Wood Chip

Shipment or Trip Origin

Business Name:

Street Address:

City: _____

State: _____

Zip: _____

Shipment or Trip Destination

Business Name:

Street Address:

City: _____

State: _____

Zip: _____

Route Followed from Origin

Route Followed to Destination

Q5. Is this shipment part of a regularly scheduled delivery?

☐₁ Yes

☐₂ No

Q5a. If yes, how many times do you repeat this trip? _____ times per (circle one) week, month, year.

Appendix C:

Freight Establishment Survey Responses and EROAD Data

Establishment Survey Data Analysis

Agriculture, Forestry, Fishing, and Hunting

How Long Has This Facility Been in Its Current Location?

Figure 34 shows that more than half (55 percent) of the agriculture facilities were reported to be in their current location for greater than 40 years. Of the remaining, 28 percent were reported to be in their current location for 20 to 30 years, 10 percent for 10 to 20 years, and 3 percent for both less than 10 years and 30 to 40 years.

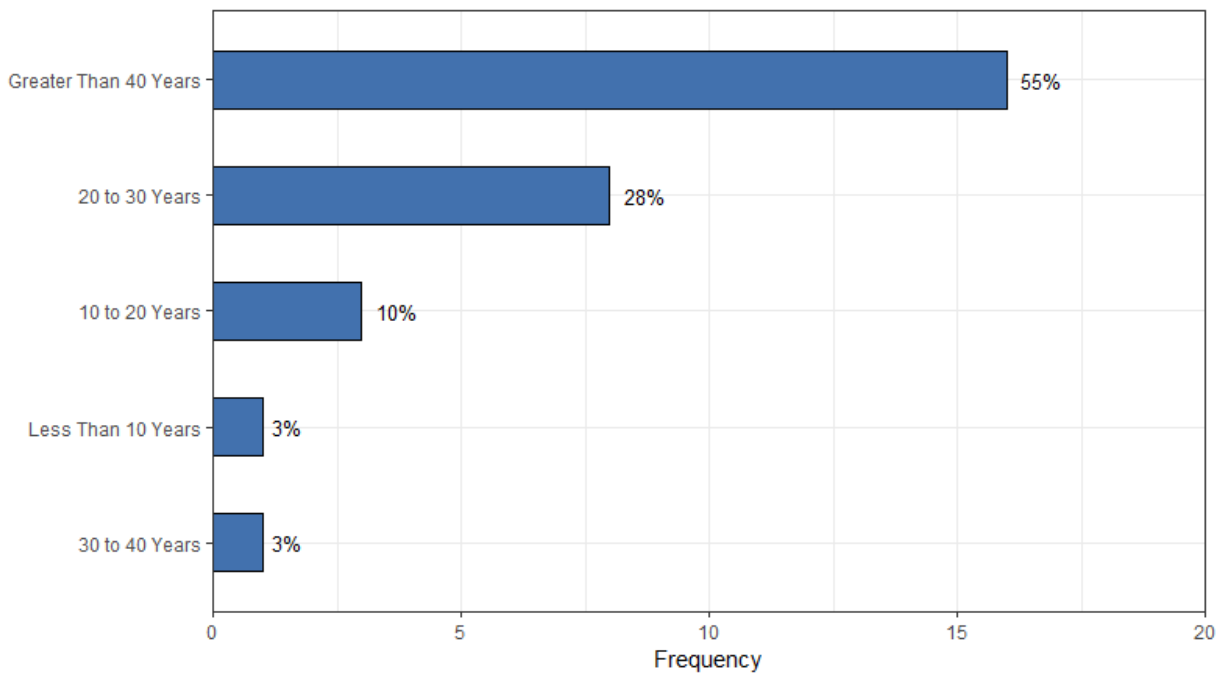


Figure 34. Length Agriculture Facility Has Been in Its Current Location

How Large is Your Facility in Terms of Shipments?

Respondents were asked to specify the unit-type and amount to describe the size of their facility in terms of shipments. As seen from Figure 35, the majority of agriculture facilities measure their shipments in tons (47 percent). Also with representing a larger proportion of agriculture facilities is Cwt. (hundredweight) at 27 percent, with other at 17 percent, bushels at 7 percent, and gallons at 3 percent. In regards to other, each respondent indicated that their unit-type for shipments is million-board-feet for lumber products.

In regards to tons, the smallest facility reported that their facility ships 15 tons and the largest reported that their facility can ship 300,000 tons. The mean value was 72,590 pounds with a standard deviation of 105,353.

For cwt., the largest facility reporting being able to ship 3,500,000 cwt. and the smallest facility 40,000 cwt. The mean value was 2,180,000 cwt. with a standard deviation of 1,026,060. For gallons, only one respondent reported a measurement: 8,000 gallons. Two facilities reported their unit-type as bushels, with the larger facility reporting being able to ship 24,000,000 bushels and the smaller facility 1,000,000 bushels. Lastly, for respondents who selected other, each stated their unit-type is in terms of million-board-feet. For these facilities, each reported being able to ship 60,000,000 million-board-feet or greater.

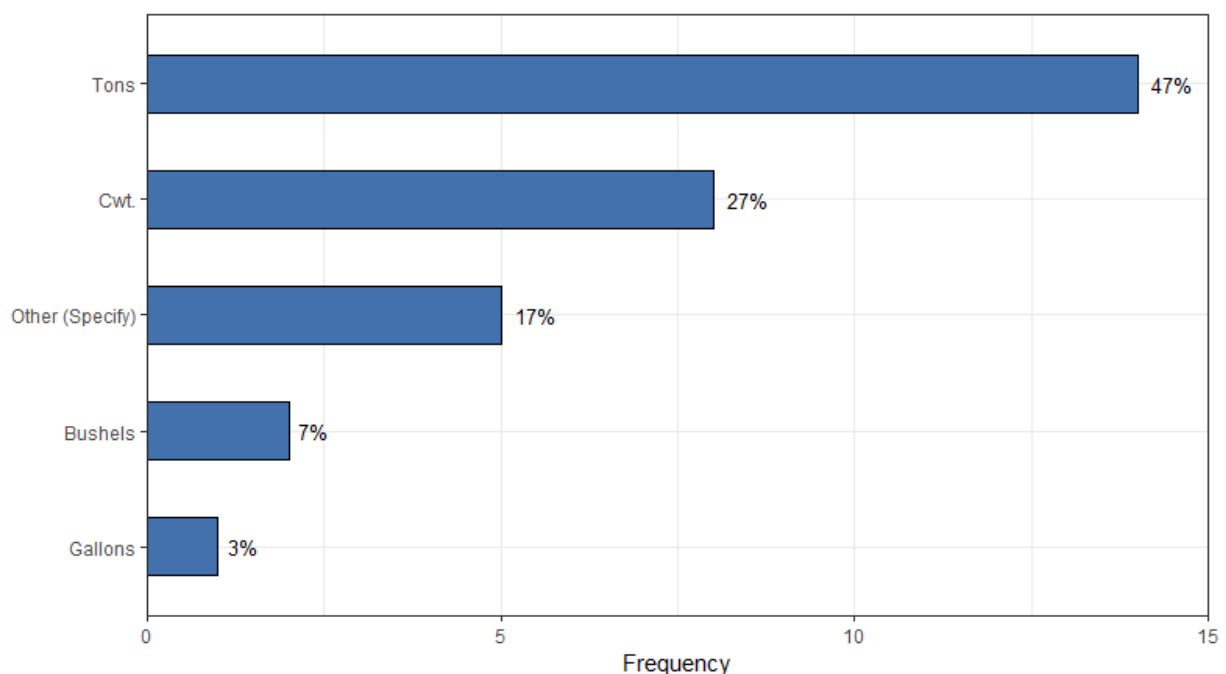


Figure 35. Unit-Type to Describe Size of Facility in Terms of Shipments

How Large is Your Facility in Terms of Storage Capacity?

Respondents were additionally asked to specify the unit-type and amount to describe the size of their facility in terms of storage capacity. As seen from Figure 36, the distribution in unit-types for storage compared to those for shipments are nearly identical (no respondent reported storage in terms of gallons).

In terms of tons, the largest facility reported being able to store 215,000 tons and the smallest facility reported being able to store 40 tons. Tons have a mean value of 23,540 and a standard deviation of 56,392. One respondent reported that their facility has the capability of storing “multi-million tons.” For cwt., the largest facility reported being able to store 100,000 cwt. and the smallest reported being

able to store 6,000 cwt. Statistics show the mean cwt. for storage capacity is 30,500 cwt. and the standard deviation is 32,382. As with shipment capacity, each respondent that reported other for storage capacity referred to their units as million-board-feet. For storage, the maximum reported storage capacity for million-board-feet is 2,000,000,000, a median of 90,000,000, and a minimum of 15,000,000. One respondent that reported other stated that their facility does not store any commodities. Lastly, facilities that reported their storage capacity in terms of bushels reported a maximum storage capacity of 10,000,000 bushels, a median of 200,000, and a minimum of 18,000.

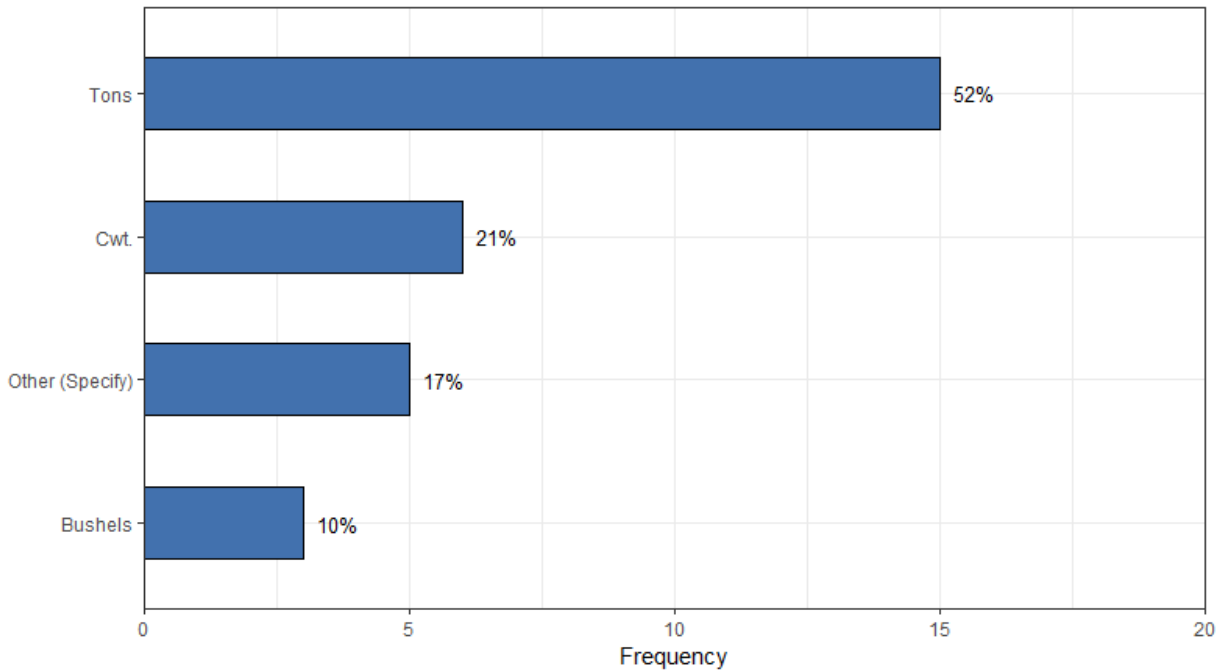


Figure 36. Unit-Type to Describe Size of Facility in Terms of Storage Capacity

How Many Facilities Such as This One Does Your Firm Own and/or Operate?

Referring to Figure 37, 73 percent of respondents indicated that the facility referred to in their survey responses is the only such facility owned and/or operated by their firm. Of the responses with more than three facilities, the following answers were observed:

- Multiple storage facilities (no number was provided).
- 45 facilities throughout Northern Idaho and Eastern Washington.
- Three to five fisheries and two gaming facilities.

Of the responses that reported a location for their facility, Figure 38 shows their location.

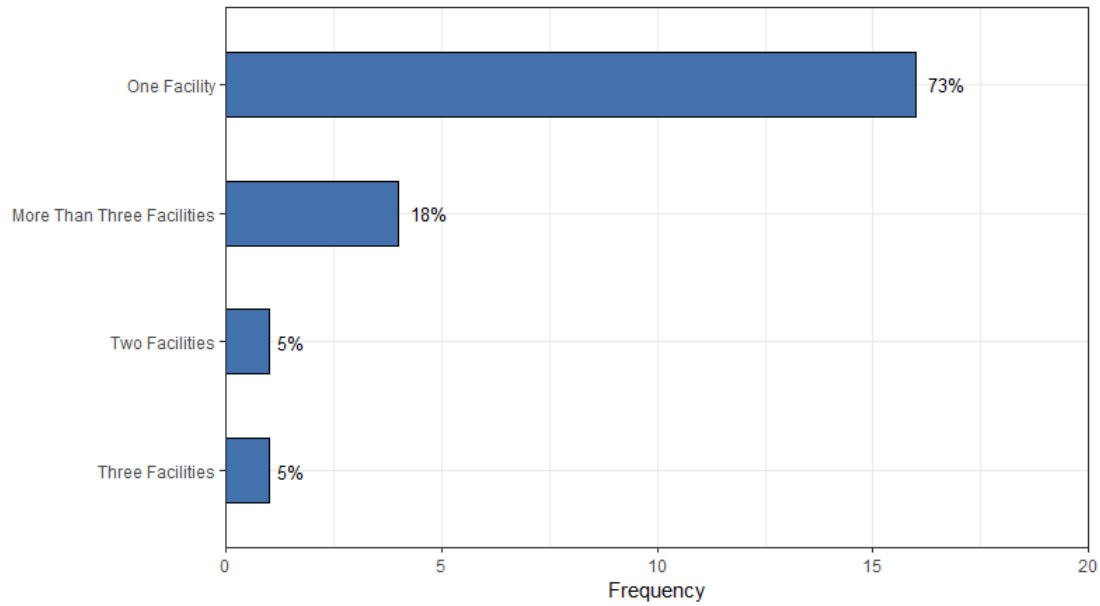


Figure 37. Number of Similar Facilities Owned and/or Operated by the Same Firm



Figure 38. Disclosed Locations of Surveyed Agriculture, Forestry, Fishing, and Hunting Facilities

How Many Employees (Including Yourself) Work at This Facility?

As shown in Figure 39, the largest proportion of respondents stated that their facilities employees (including themselves) 10 people or less. The highest number of employees reported was 1,300. Summary statistics show that the average number of employees is 114, with a standard deviation of 228.

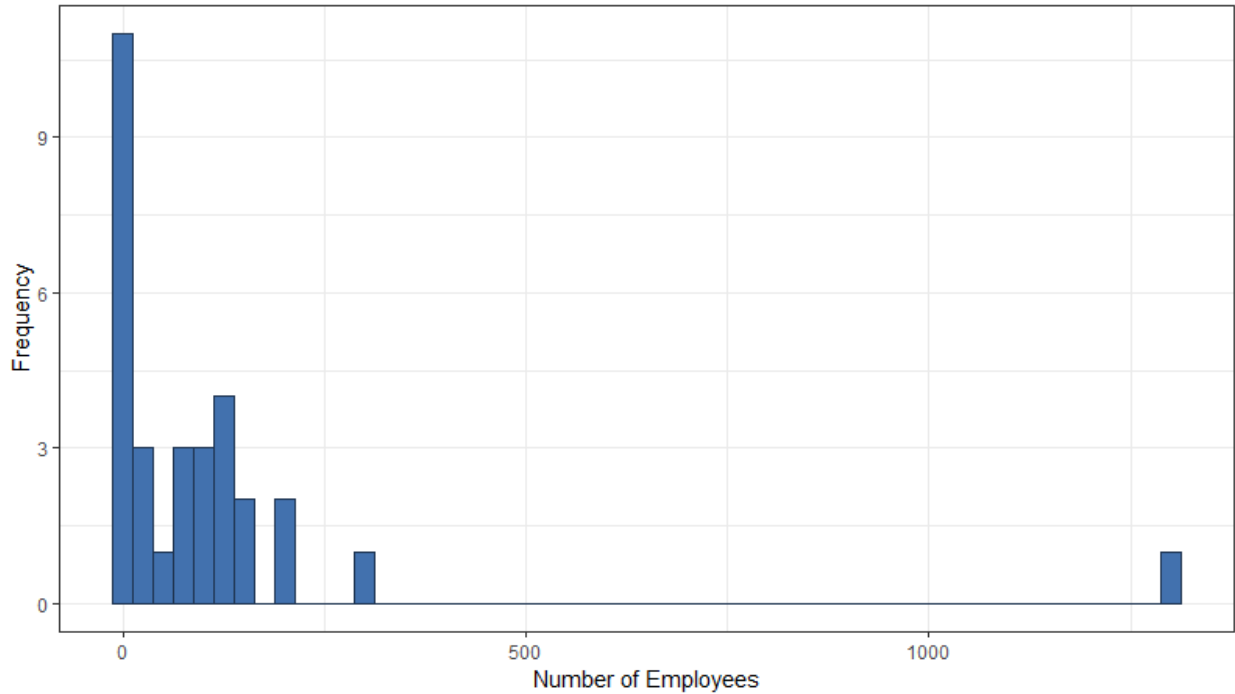


Figure 39. Distribution of Number of Reported Workers

What is the Primary Commodity Received at This Location?

Figure 40 shows the primary commodities, as reported by the surveyed facility representatives, received at their facilities. Representing the largest proportion are grain and wheat products, accounting for 29 percent of responses. Wood products and potatoes also account for a notable proportion of the survey responses, while the remaining received only one response each.

Facility representatives were also asked what other types of commodities are received at their location. Other commodities include:

- Flax and safflower.
- Berries, summer squash, cucumbers.
- Cream and powdered milk.
- Packaging materials.
- Live honey bees.
- Chickpeas and lentils.
- Wheat and barley.

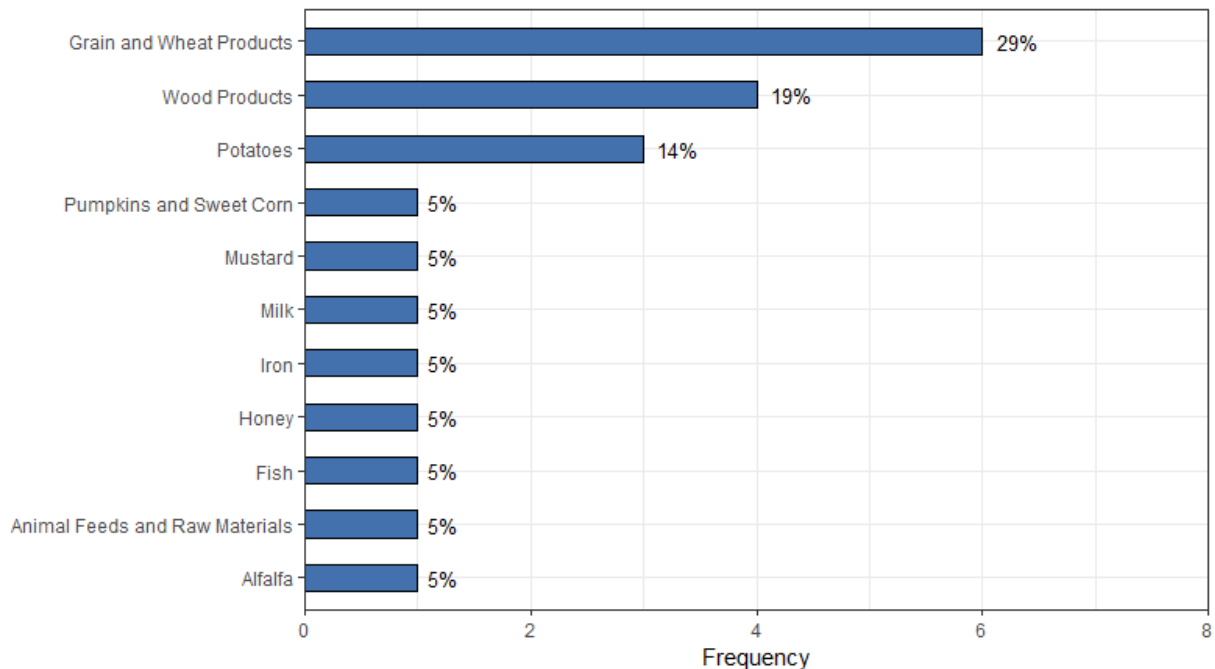


Figure 40. Reported Primary Commodities Received

What is the Primary Commodity Produced/Shipped from This Location?

Survey respondents were then asked what is the primary commodity produced or shipped from their location. Referring to Figure 41, the most common commodity produced/shipped at the surveyed facilities are potatoes, followed by grain and wheat products, and wood products.

Once more, the facility representatives were asked to report any other commodities produced/shipped from their location. These commodities include:

- Mulch or hog fuel.
- Feed supplement.
- Flax and safflower.
- Wheat and barley.
- Apples, cherries, peaches, prunes, plums, pears, nectarines, and onions.
- Waste and seed containers, tanks, and industrial and agricultural grinders.
- Drilling equipment.
- Shavings.
- Bees wax.

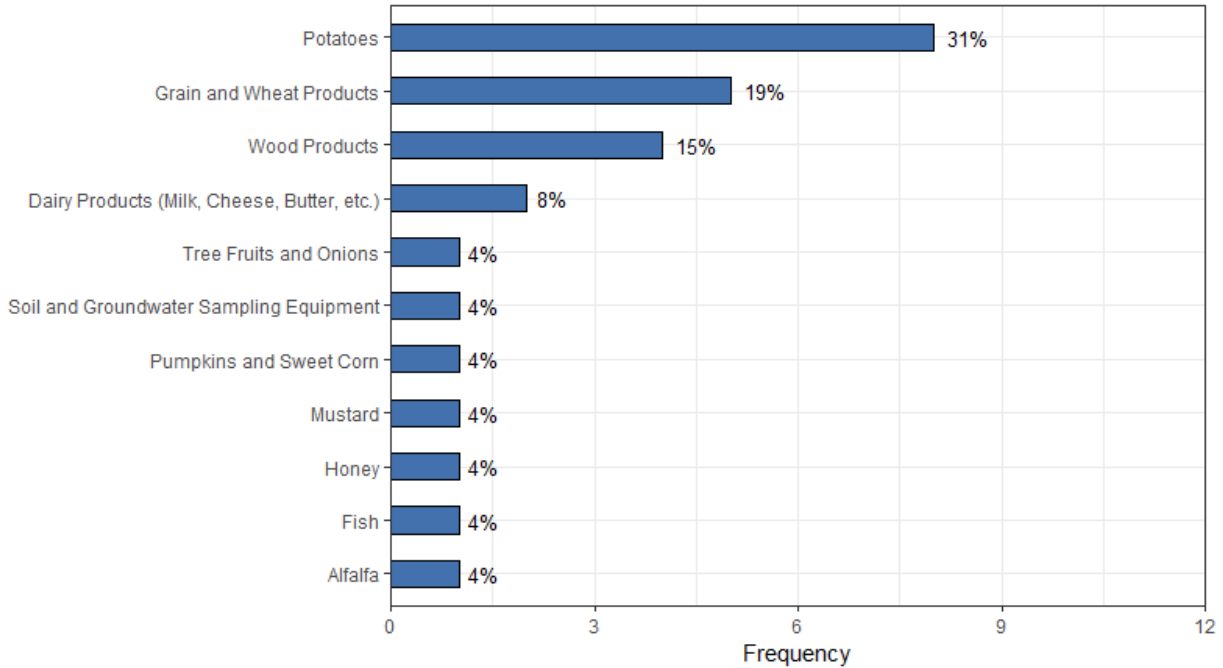


Figure 41. Reported Primary Commodities Shipped/Produced

At This Location, is There Loading/Unloading Capabilities for Truck and/or Rail?

Each respondent indicated that their location has loading and unloading capabilities for truck. However, not all respondents stated that their facility has loading and unloading capabilities for rail. In particular, 46 percent reported that they do have loading and unloading capabilities for rail and 54 percent reported that they do not have such capabilities.

Specify the Locations of Origin for the Top Commodities of Inbound Freight.

For this question, facility representatives were asked to locations of origin for inbound freight in the form of a city and state.

Of the locations of origin shown in Figure 42 and Figure 43, the majority of commodities are shipped via truck (16 facilities representatives indicated truck as the primary mode). For truck shipments, the maximum reported distance traveled was 2,400 miles and the minimum 25 miles. Other comments from the facility representatives include:

- 100 miles or less.
- 50 miles or less.
- Ranging between 5 miles and 350 miles.
- Distance traveled varies.

Rail was also selected as the primary mode by one facility representative, in which the distance reported was 3,000 miles.

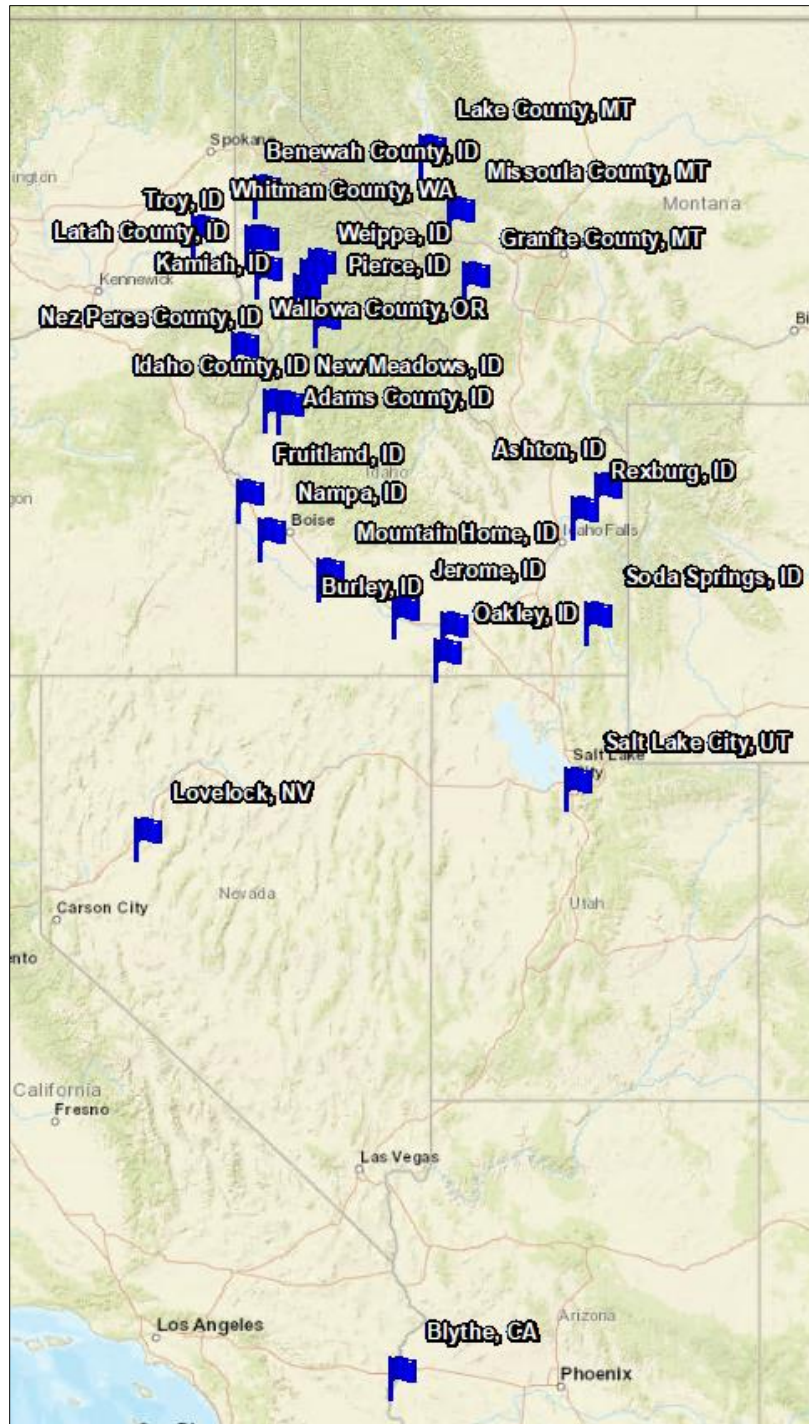


Figure 42. Locations of Origin of Top Commodities of Inbound Freight

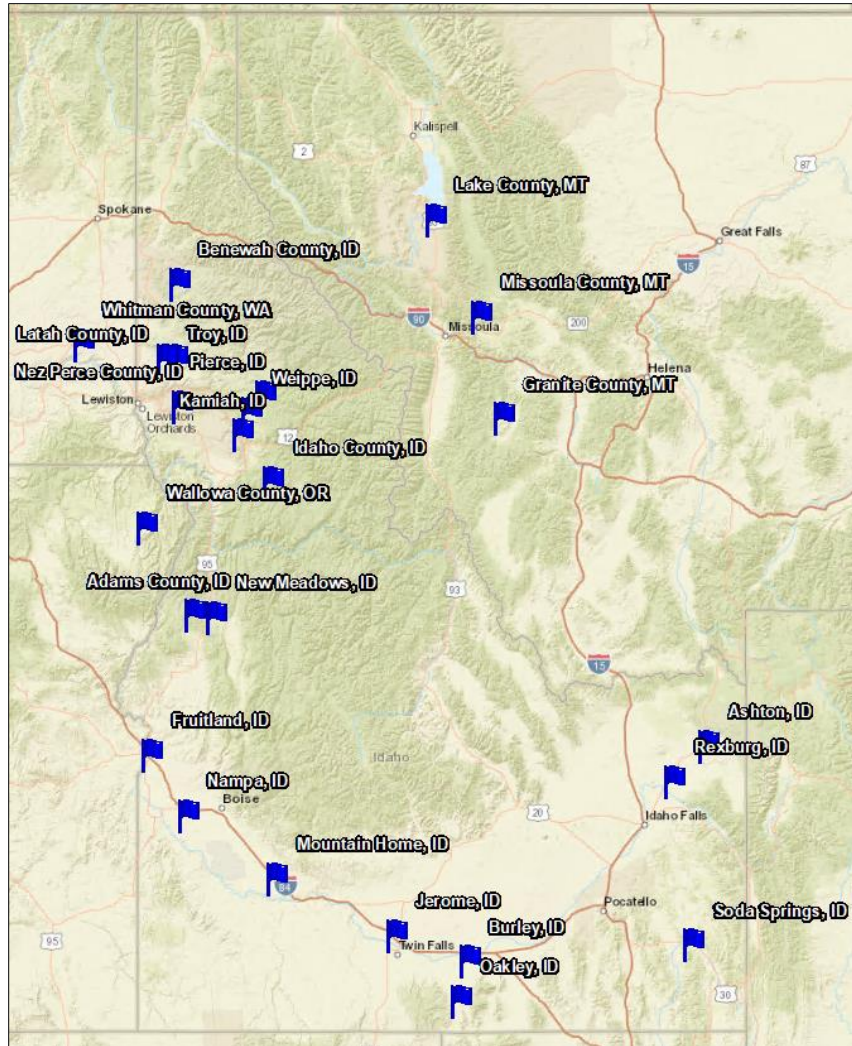


Figure 43. Locations of Origin of Top Commodities of Inbound Freight (Idaho-Specific)

What Type of Facility is This Shipment Arriving From?

Figure 44 shows that the major of facilities representatives reported that their shipments are arriving from a facility type not listed in Figure 44. Representatives were asked to specify the type of facility, where the types of facilities are as follows:

- Forests.
- Storage sheds/facilities.
- Farm.

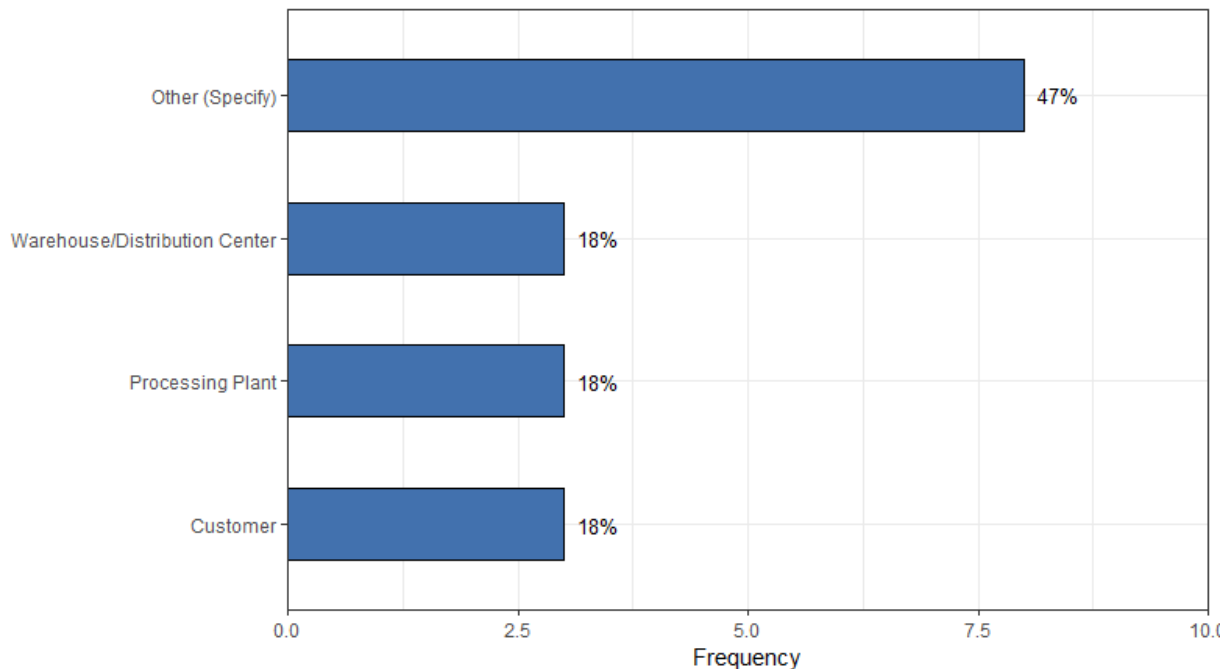


Figure 44. Type of Facilities Shipments are Reported to Originate

Best Describe the Route for Inbound Truck Shipments

Figure 45 shows the different road types used for truck shipments as reported by the facility representatives. Of the representatives that answered, the majority reported that rural interstates are the primary road type used for inbound truck shipments. Other road types of note are state highways and representatives that reported other, in which other road types were all described as county roads.

Representatives also listed the name of the highways, which consist of the following:

- I-15
- I-86
- I-84
- US-93
- Highway 20
- Highway 48
- Highway 98

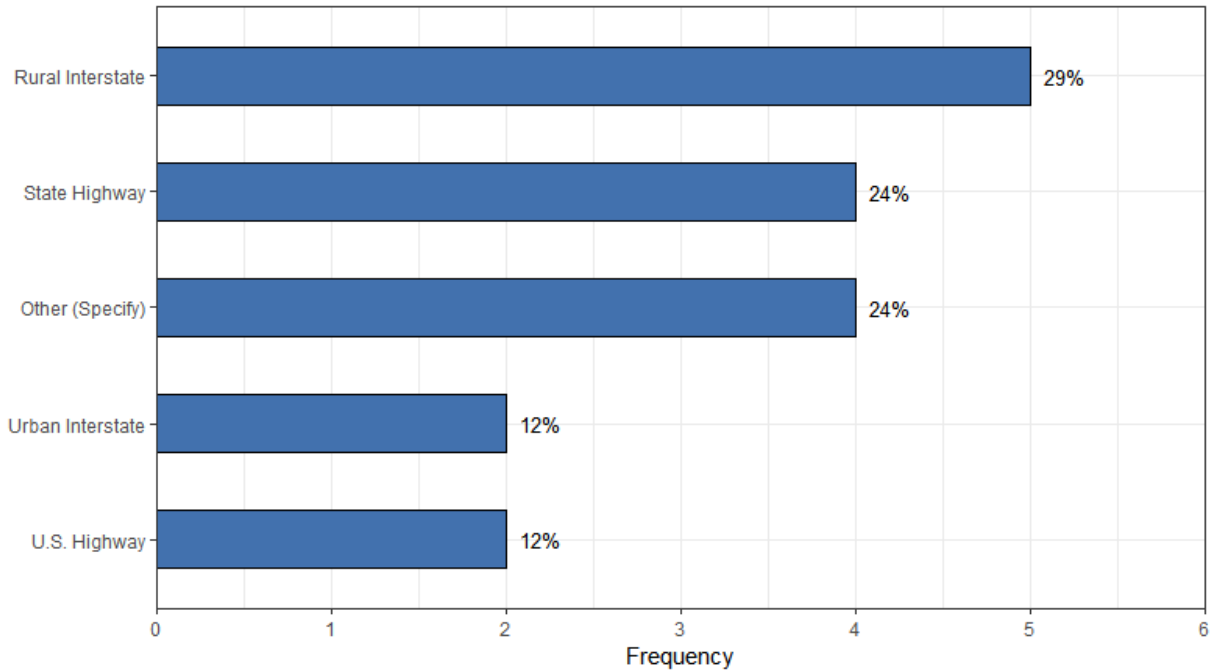


Figure 45. Road Type Used for Inbound Truck Shipments

How Large is the Normal Truck Shipment?

In terms of tons, the largest reported normal truck shipment destined to the facility was 40 tons per normal truck shipment. The minimum reported truck shipment destined to the facility was two to five tons per normal truck shipment. The mean value was 21 tons with a standard deviation of 14.

In regards to cwt., four facility representatives reported their normal truck shipment destined to their facility. Two of the representatives reported 600 cwt., one reported 625 cwt., and one reported 420 cwt. Gallons was reported by one representative at a value of 10,000, bushels reported by one representative at a value of 1,150, and three representatives reported other. Of the representatives that reported other, one reported that shipments vary too much, one reported that their normal shipments consist of 40 ft. containers, and one reported that their shipments consist of less than 150 pounds.

How Many Truck Shipments do You Usually Receive?

Representatives for this questions answer in several ways. Of the representatives that answered in terms of days, responses consist of the following:

- Five shipments per day.
- 26 shipments per day.
- 30 shipments per day.
- Three shipments per day.
- Five to 10 trucks per day.
- Five to eight shipments per day.

- 15 to 20 shipments per day.

Of the representatives who answered in terms of weeks:

- One truck per week.
- Two to three shipments per week.
- Two shipments per week.
- Four shipments per week.

Of the representatives who answered in terms of months:

- Five shipments per month.
- Three shipments per month.
- 20 to 25 40 ft. containers per month.

Of the representatives who answered in terms of year:

- Eight shipments per year.
- 1,311 shipments per year.
- 7,500 shipments per year.
- 4,960 shipments per year.
- Five to six shipments per year.
- 20,870 trucks per year.
- 80,000 truckloads per year.

Specify the Locations of Destination for the Top Commodities of Outbound Freight?

Figure 46 shows the locations of destination for top commodities as reported by the facility representatives. As displayed, locations of destination are located across the country. Other responses include:

- Products are mainly shipped to the Western United States.
- Products are mainly shipped to east of the Mississippi River.
- All over the United States and worldwide.
- Kansas and Florida.
- Southern Idaho.
- Shipped via barge to Portland, OR.

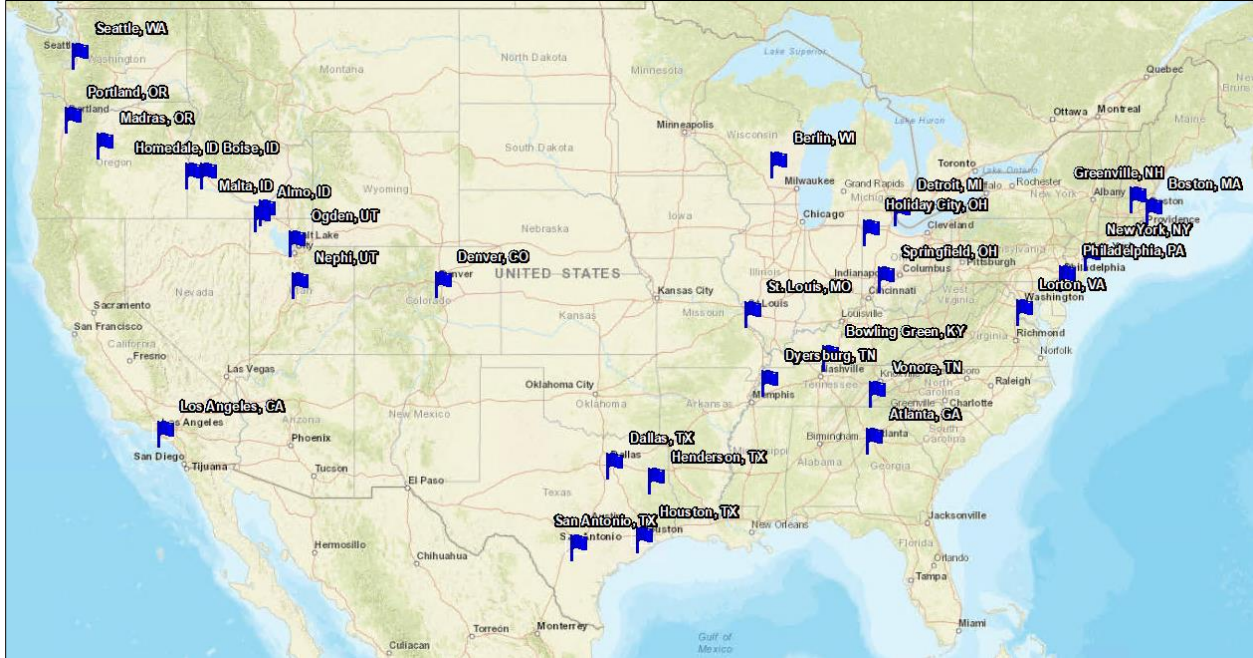


Figure 46. Locations of Destination for Top Commodities as Reported by Facility Representatives

Of the modes used to deliver goods from these facilities, the majority are delivered via truck. The maximum distance traveled for goods destined to the locations observed in Figure 46 was reported to be 2,800 miles and the minimum reported to be 225 miles. Other responses include:

- 290 to 2,800 miles.
- Varies.
- Up to 2,600 miles.
- Between 20 and 300 miles.

Facility representatives also indicated that some of these shipments are delivered via rail, in which the maximum distance was reported to be 2,200 miles and the minimum distance reported to be 800 miles. Lastly, for the representative that stated shipments are delivered to Portland, OR, by barge, the reported distance is 350 miles.

What Type of Facility is This Shipment Going to?

As shown in Figure 47, the majority of outbound shipments (as reported by the facility representatives who answered this question) are being delivered to customers, with equal shipments being destined to a warehouse or distribution center and representatives who selected other. Each other statement indicated that shipments are destined to “All of the above.”

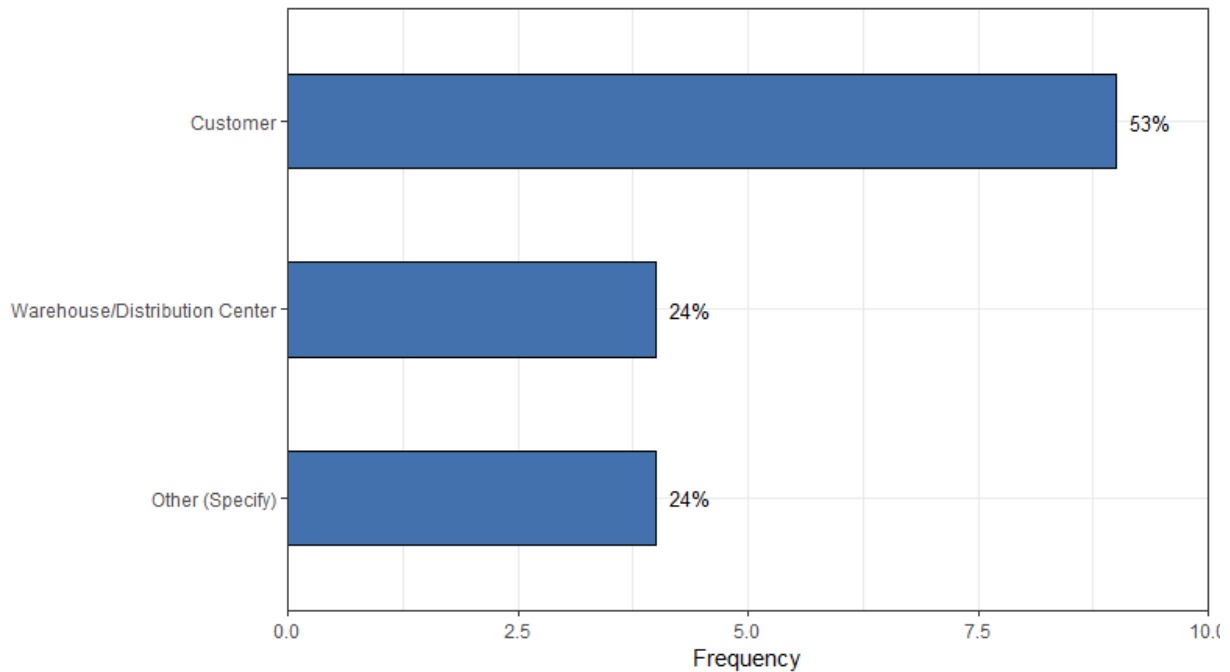


Figure 47. Type of Facilities Shipments are Destined

Best Describe the Route for Outbound Truck Shipments

As reported by the facility representatives, Figure 48 shows the road types most used by trucks for outbound shipments. The most often reported road type are urban and rural interstates, with 18 percent of representatives selected other. Of the representatives that selected urban and rural interstates, the specified routes include: I-84, I-80, and I-15. As for representatives that selected other, two reported that outbound truck shipments use all road types and one reported that their facility ships only by barge. For the barge shipment, the route identified was the Columbia/Snake River shipping system.

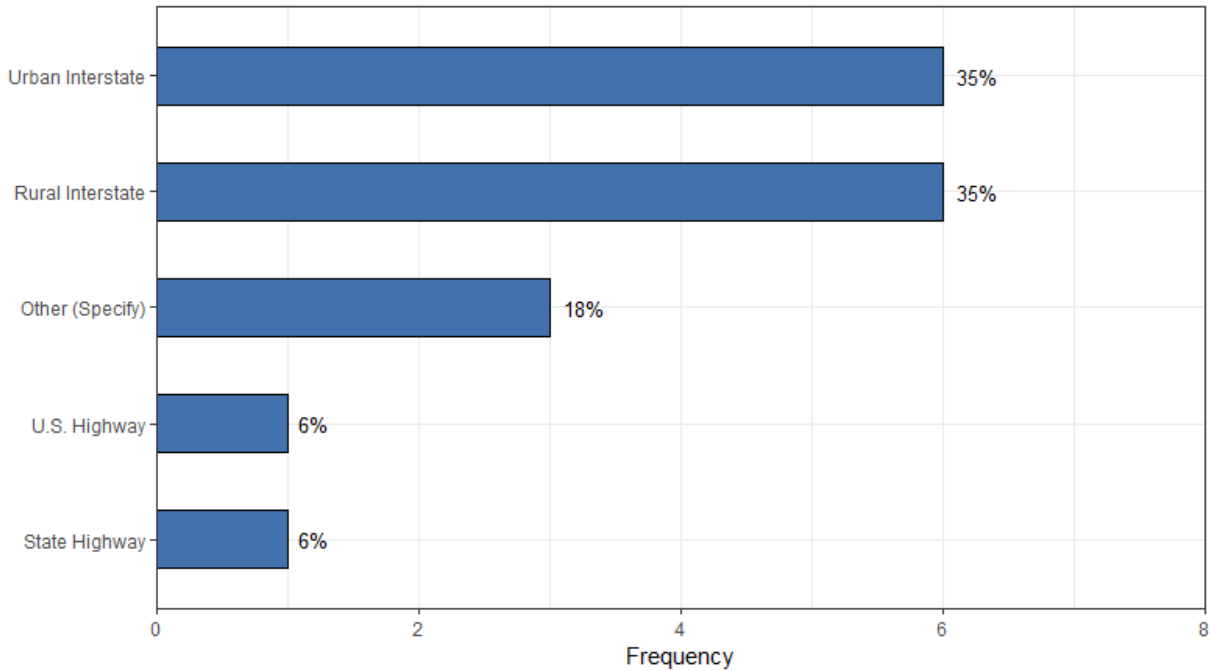


Figure 48. Roadway Type Most Used for Outbound Truck Shipments

How Large is the Normal Truck Shipment?

In terms of tons, the maximum reported size of normal truck shipments was 30 tons and the minimum reported size of normal truck shipments 1.5 tons. Facility representatives also reported truck shipments in terms of cwt., where the maximum amount shipped was 500 cwt. and the minimum 410 cwt. For the facility that reported shipping only by barge, their normal shipment was reported as 120,000 bushels.

How Many Trucks Shipments do You Usually Make?

Representatives for this questions answer in several ways. Of the representatives that answered in terms of days, responses consist of the following:

- 30 shipments per day.
- 10 shipments per day.
- Five shipments per day.
- Eight loads per day.

Of the representatives who answered in terms of weeks:

- 100 shipments per week.
- 30 to 60 shipments per week.
- Two shipments per week.
- 15 to 20 shipments per week.
- Four shipments per week.

- Five shipments per week.

Of the representatives who answered in terms of months:

- 40 to 50 loads per month.
- Four shipments per month.

Of the representatives who answered in terms of year:

- 320 shipments per year.
- 6,000 shipments per year.

What Times of Year do Inbound Shipments Most Often Arrive at This Location?

Figure 49 shows the times of year reported by the facility representatives that inbound shipments are most often received. The fall months of September to November were reported most often, followed by the summer months of June to August. Spring months and winter months had two and one response, respectively.

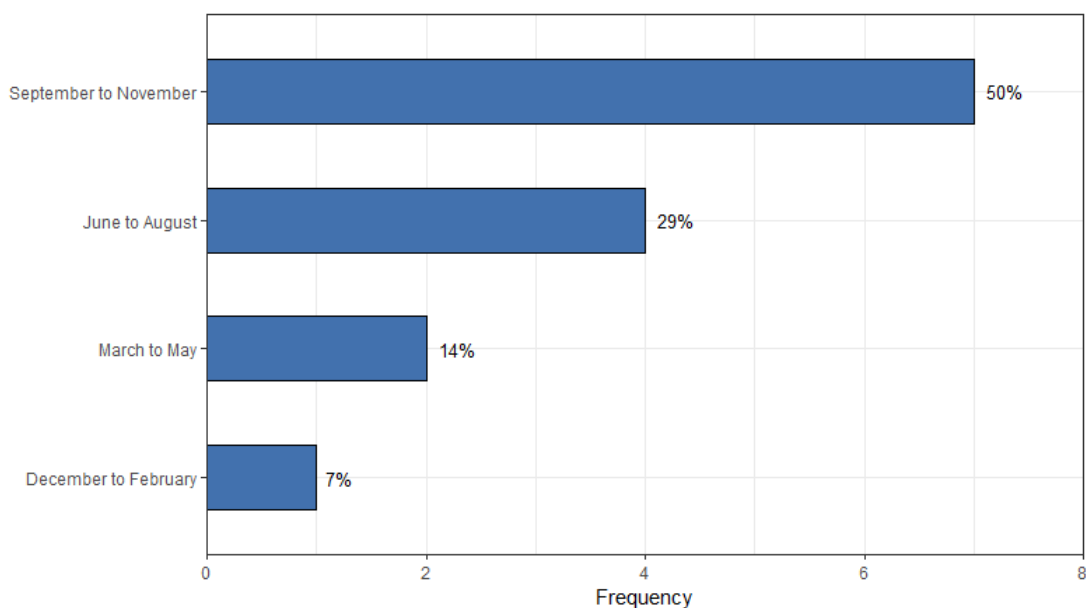


Figure 49. Times of Year Inbound Shipments Most Often Arrive at This Location

What Times of Year do Outbound Shipments Most Often Leave This Location?

As observed in Figure 50, the times of year in which shipments most often leave this location follow the same trend as shipments that most often leave this location.

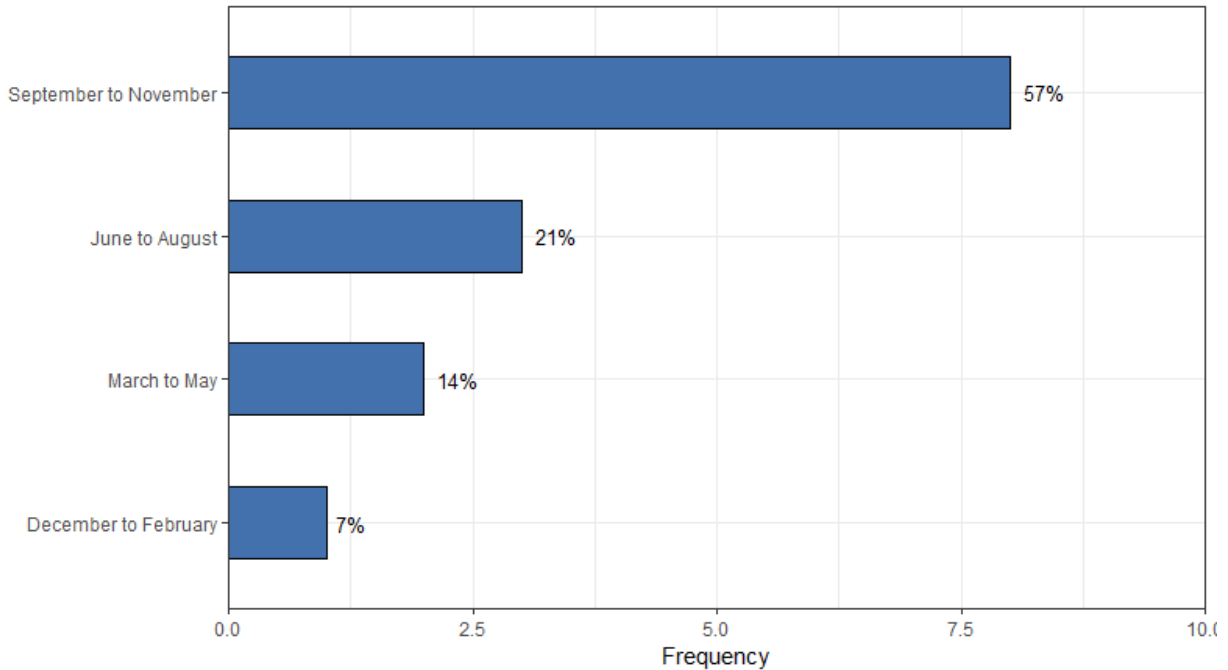


Figure 50. Times of Year Outbound Shipments Most Often Leave This Location

Other Manufacturing

Due to there being significantly less respondents in this industry type, the authors have elected to present the results in-text as opposed to graphical plots.

How Long Has This Facility Been in Its Current Location?

Of the facility representatives who answered this question, two stated that their facility has been in its current location for less than 10, two stated that their facility has been its current location for 10 to 20 years, four stated that their facility has been in its current location for 20 to 30 years, one stated their facility has been in its current location for 30 to 40 years, and three stated that their facility has been in its current location for more than 40 years.

How Large is Your Facility in Terms of Shipments?

Unlike Section 1, representatives in the Other Manufacturing industry selected their unit-types to be tons, with one representative stating their unit-type as cwt. Of the representatives who measure their facility size (in terms of shipments) in tons, the maximum value reported was 4,000 and the minimum value reported was 15. For the single response pertaining to cwt., the facility representative did not provide a value. In addition, four representatives reported other, in which representatives reported their facility size in terms of shipments as follows:

- Business is confidential, cannot disclose size.
- 150 shipments.

- One representative stated their size in terms of boxes, but did not provide a number boxes.
- One representative stated their size as a number of trucks: six trucks per day.

How Large is Your Facility in Terms of Storage Capacity?

For representatives who reported their storage units as tons, the maximum reported storage capacity was 800 tons and the minimum reported storage capacity was 15 tons. No storage capacity was reported for the other unit-types; however, three representatives reported the following:

- Business is confidential, cannot disclose size.
- Storage capacity of 10,000 square feet.
- Storage capacity of 9,000,000 board feet.

How Many Facilities Such as This One Does Your Firm Own and/or Operate?

For Other Manufacturing, the majority of representatives stated that there is only the one facility that their firm owns or operates (six representatives indicated such). Three representatives stated that their company owns or operates two similar facilities and one stated that their company owns or operates more than 20 similar facilities.

How Many Employees (Including Yourself) Work at This Facility?

Of the representatives who answer the question regarding the number of employees, the highest number reported was 400 employees and smallest number reported was five employees. Other responses include 86 employees, 60 employees, 44 employees, 16 employees, 10 employees, and eight employees.

What is the Primary Commodity Received at This Location?

Primary commodities received at this location for the Other Manufacturing industry type, as reported by the surveyed representatives, consist of the following:

- Concrete ash.
- Raw material.
- Polyurethane foam chemical.
- Steel.
- Cut/Bent steel (sheets, tubes, etc.).
- Metals.
- Paperboard,
- Parts for bindings.
- NVG.

In addition, other commodities received at these locations include:

- Gravel.
- Finished goods.

- Foil.
- Smoke and fire resistant curtain material, magnets, electric motors, and electronics.
- Metal components.
- Polyethylene foam planks and ink.

What is the Primary Commodity Produced/Shipped From This Location?

Primary commodities produced/shipped from this location for the Other Manufacturing industry type, as reported by the surveyed representatives, consist of the following:

- Precast concrete products.
- Hardware.
- Expanded plastics.
- Smoke and fire curtains that deploy during a fire.
- Metals.
- Shipping boxes.
- Telemark ski bindings.
- NVG.

In addition, other commodities produced/shipped from these locations include:

- Controllers (e.g., electronics, hardware).
- Metal components.
- Retail cartons.

At This Location, is There Loading/Unloading Capabilities for Truck and/or Rail?

Pertaining to loading/unloading capabilities, each facility representative that answered this question stated that their facility does have such capabilities for truck. In terms of rail, four of the 12 representatives that answered this question stated that they do have loading/unloading capabilities for rail. The remaining eight representatives who answered this question stated that their facility does not have such capabilities for rail.

Specify the Locations of Origin for the Top Commodities of Inbound Freight

For locations of origin within the United States for top commodities of inbound freight, refer to Figure 51. In addition to these locations of origins, facilities representatives also stated that they receive top commodities from:

- All over the United States and worldwide.
- Japan.
- Australia.

Of the arriving commodities, representatives reported that the maximum distance traveled by truck is 500 miles and the minimum distance is 80 miles (these were the only two responses). No representative

reported any distances for rail, or that rail was used to receive commodities. Lastly, one representative reported receiving goods via barge, in which the distance reported was 7,000 miles.

What Type of Facility is This Shipment Arriving From?

Of the facility representatives who answered this question, two reported receiving this shipment from processing plants, two reported receiving this shipment from a warehouse or distribution center, and one reported receiving this shipment from a manufacturing plant.

Best Describe the Route for Inbound Truck Shipments

Reported routes for inbound truck shipments include two representatives reporting state highways, two representatives reporting U.S. highways, and two representatives reporting interstates (one reported rural, but the other did not disclose). Specific names of the routes include I-15, I-84, and US-30. In addition, one representative reported using “any major interstate” and another reported using “any” route.

How Large is the Normal Truck Shipment?

Of the representatives who answered this question, five reported their normal truck shipment in terms of tons and one reported their normal truck shipment in terms of cwt. For tons, the maximum reported value was 40 tons and the minimum reported value was 1.5 tons.

How Many Truck Shipments do You Usually Receive?

Representatives for this questions answer in several ways. Of the representatives that answered in terms of days, responses consist of the following:

- Five shipments per day.
- Five to eight shipments per day.

Of the representatives who answered in terms of weeks:

- Four shipments per week.

Of the representatives who answered in terms of year:

- Eight shipments per year.
- Five to six shipments per year.

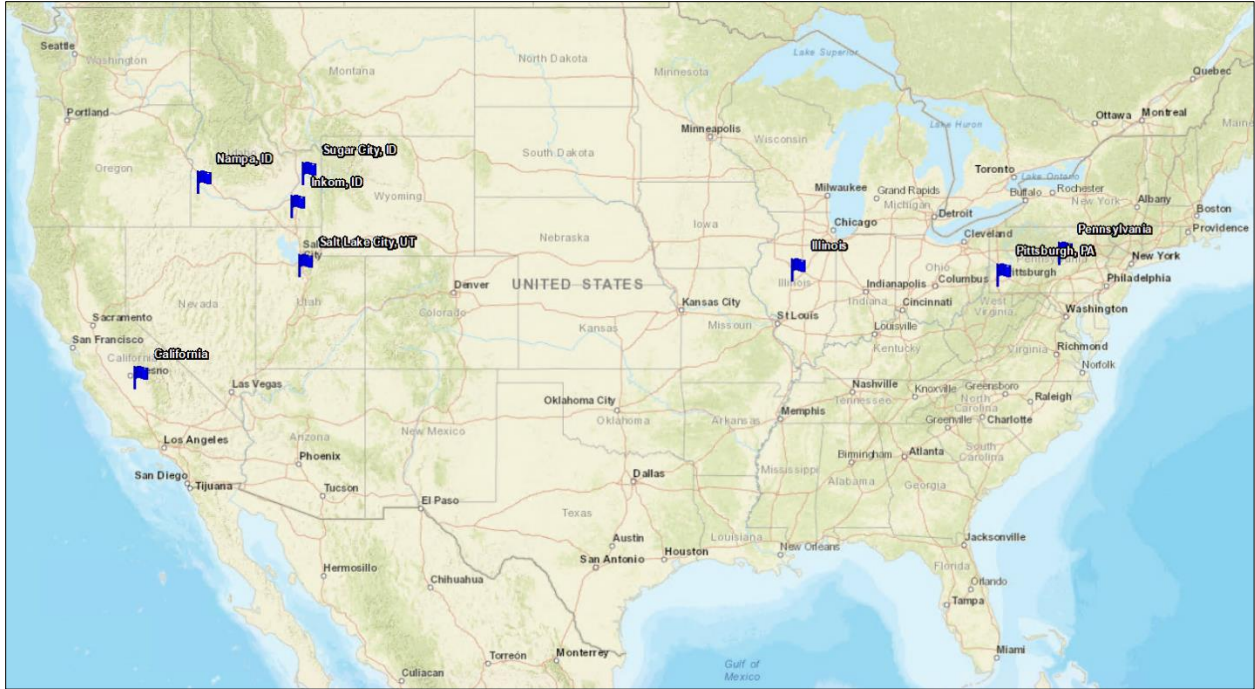


Figure 51. Locations of Origin of Top Commodities of Inbound Freight

Specify the Locations of Destination for the Top Commodities of Outbound Freight?

Figure 52 shows the locations of destination of top commodities shipped by the surveyed Other Manufacturing facilities.

Of the modes used to deliver goods from these facilities, all representatives reported truck. The maximum distance traveled for goods destined to the locations observed in Figure 52 was reported to be 2,400 miles and the minimum distance reported to be 40 miles.

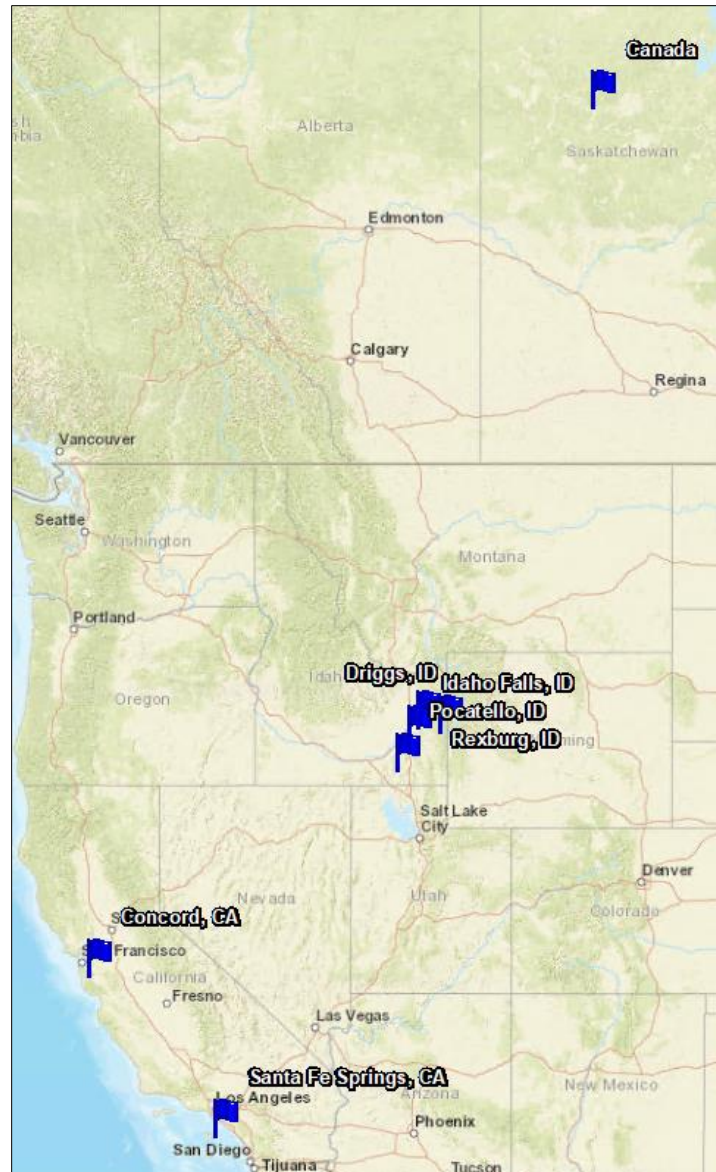


Figure 52. Locations of Destination for Top Other Manufacturing Commodities as Reported by Facility Representatives

What Type of Facility is This Shipment Going to?

Regarding types of facilities in which the shipment is going, two representatives reported their shipments being destined to customers, two reported their shipments being destined to warehouses or distributions centers, and one reported their shipments being destined to construction sites.

Best Describe the Route for Outbound Truck Shipments

In describing the route for outbound truck shipments, two representatives reported using urban interstates, two reported using state highways, and one reported using rural interstates. Of the representatives that disclosed the route name, I-84 and US-20 were reported. One representative reported using “any” route, specifically state highways.

How Large is the Normal Truck Shipment?

Regarding outbound truck shipment size, responses were rather limited. Of the three representatives that reported size for outbound truck shipments, sizes include 21 tons, 1.5 tons, and 17,000 pounds.

How Many Trucks Shipments do You Usually Make?

For outbound shipments, just four representative reported answers. Reported number of shipments include:

- One shipment per day.
- Three to four shipments per week.
- Ten shipments per month.
- 120 shipments per year.

What Times of Year do Inbound Shipments Most Often Arrive at This Location?

In terms of inbound shipments, two times of year were reported. Specifically, two representatives reported September to November and three representatives reported June to August.

What Times of Year do Outbound Shipments Most Often Leave This Location?

In regard to outbound shipments, September to November was reported by two representatives, June to August reported by one representative, and March to May reported by one representative.

Other Industry

For surveyed facility representatives who felt their industry did not fall into one of the industry types, they were to select Other Industry. Tantamount to Other Manufacturing, the responses were significantly less for this industry type when compared to Agriculture, Forestry, Fishing, and Hunting. As such, only select visual plots will be provided to accompany in-text summaries.

Being that representatives selected Other Industry; they were also asked to specify the industry type. Referring to Figure 53, three representatives reported their industry type as economic development, two reported their industry type as government, and one representative reported their industry type for the remaining (i.e., each additional industry type was reported by just one representative).

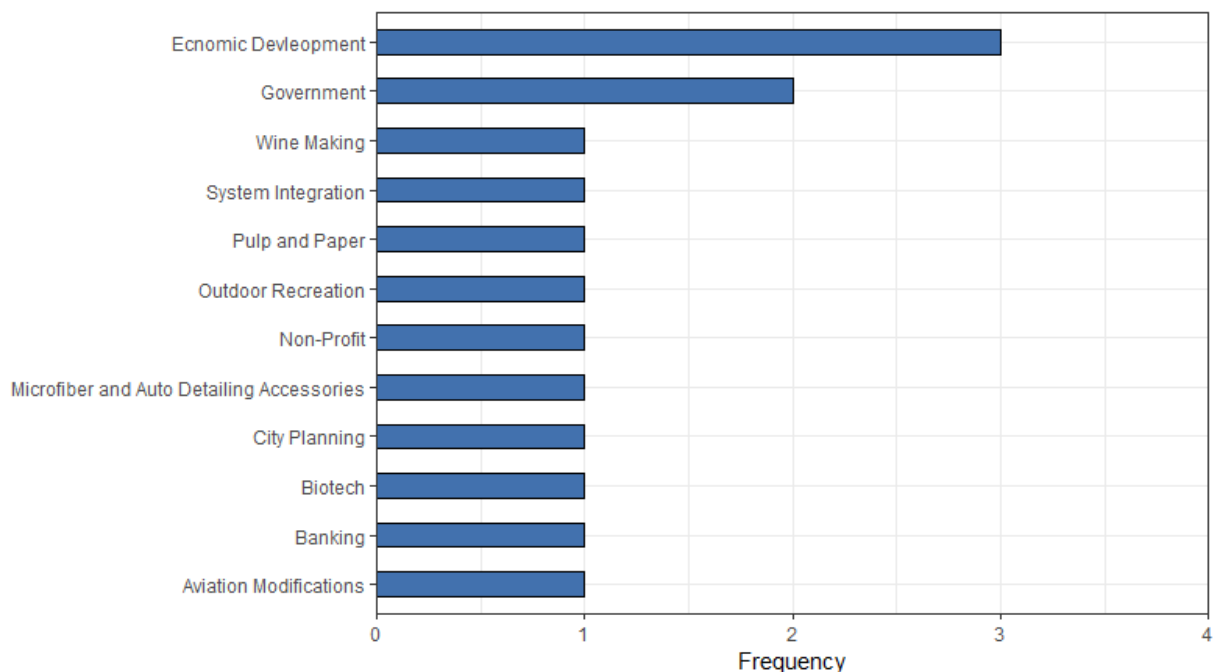


Figure 53. Other Industry Types as Reported by Facility Representatives

How Longs Has This Facility Been in Its Current Location?

Of the representatives that answered this question, the following responses were received:

- 75 years.
- 24 years.
- 17 years.
- Three years.
- 1.5 years.

How Large is Your Facility in Terms of Shipments?

In terms of tons, one representative reported their facility as large as 2.8 million tons of shipments (this corresponds to the paper and pulp industry) and one representative reported their facility as large as 105 tons of shipments. Other responses include “10 million in goods,” but the representative did not state whether this was in dollars, tons, number of packages, etc. The last representative who reported an answer for this question stated that their facility size in terms of shipments is 15 parcels.

How Large is Your Facility in Terms of Storage Capacity?

One representative reported their size in terms of storage capacity to be 80,000 tons (this also corresponds to the paper and pulp observation). Other responses include 5,000 cases, 50,000 square feet, and a “large aircraft hangar.”

How Many Facilities Such as This One Does Your Firm Own and/or Operate?

Just four representatives responded to this question, where reported answers include:

- Three representatives reported having just one similar facility.
- One representative reporting having two facilities, one in Idaho and one in Arkansas.

How Many Employees (Including Yourself) Work at This Facility?

Once more, just four representatives provided answers for this question, in which the number of employees were reported to be eight, 45, 55, and 800.

What is the Primary Commodity Received at This Location?

Of the top commodities reported by representatives who indicated they belong to Other Industry, top commodities include:

- Grapes.
- Wood chips.
- Inflatable boats and related boating accessories.
- Night vision imaging system pieces and parts.
- Microfiber products.

Additional commodities received include:

- Barrels, boxes, corks, and tanks.
- Chemicals.
- Fuel.
- Filtered plastic and glass for airplane cockpit modifications.

What is the Primary Commodity Produced/Shipped From This Location?

Primary commodities produced/shipped from this location for the Other Industry type, as reported by the surveyed representatives, consist of the following:

- Wine.
- Pulp and paper.
- Inflatable boats for whitewater rafting and fishing.
- Airplane cockpit component filters.

Additional commodities produced/shipped from this location include:

- Tissue.
- Night vision imaging systems.

At This Location, is There Loading/Unloading Capabilities for Truck and/or Rail?

Each representative who answered this question reported having loading and unloading capabilities for truck. As for rail, one representative reporting have such capabilities and four representatives reported not having such capabilities.

Specify the Locations of Origin for the Top Commodities of Inbound Freight

For locations of origin of top commodities of inbound freight for Other Industry, see Figure 54. No representatives reported the amount or distance traveled by mode for incoming freight from these locations.

What Type of Facility is This Shipment Arriving From?

Just two representatives answered this question, where one representative reported receiving this shipment from a warehouse or distribution center and one representative reporting receiving this shipment from a processing plant. One of these representatives also reported receiving this shipment from vineyards.

Best Describe the Route for Inbound Truck Shipments

Again, just two representatives elected to answer this question. Of the two representatives, one reported receiving truck shipments via urban interstates and the other reported receiving truck shipments via state highways. The two routes specifically identified were I-84 and Idaho State Highway 95.

How Large is the Normal Truck Shipment?

One representative reported an answer for this question and stated that their normal truck shipment is approximately 34 tons.

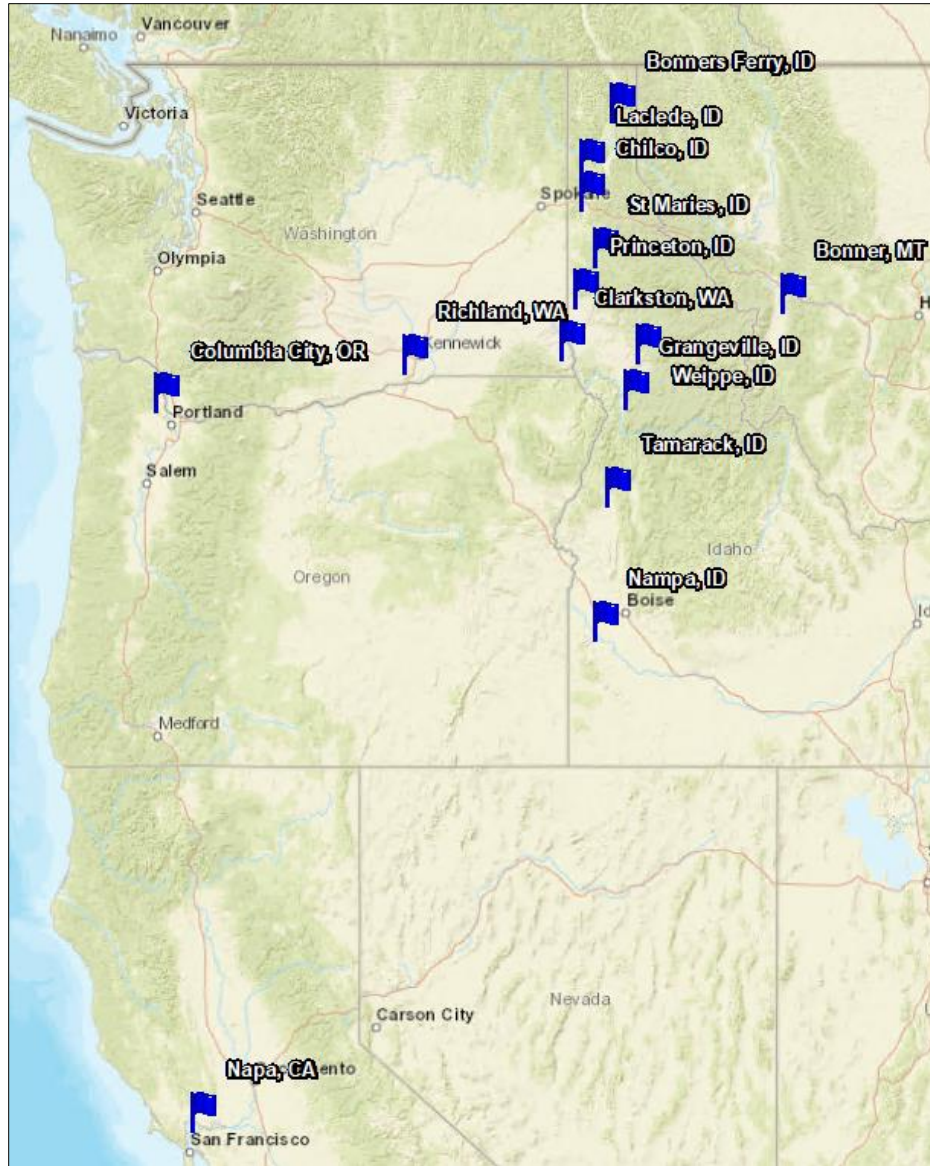


Figure 54. Locations of Origin of Top Commodities of Inbound Freight for Other Industry

How Many Truck Shipments do You Usually Receive?

Once more, just one representative reported an answer for this question. Specifically, the representative reported receiving 80,000 truckloads per year.

Specify the Locations of Destination for the Top Commodities of Outbound Freight?

The only response for this question was due to a representative stating that they ship commodities to the West Coast of the United States. No weights or distances were provided.

What Type of Facility is This Shipment Going to?

The one response reported that shipments were headed to customers.

Best Describe the Route for Outbound Truck Shipments

One representative responded to this question and reported using state highways; specifically, Idaho State Highway 12 and Idaho State Highway 95.

How Large is the Normal Truck Shipment?

Once more, only one response was received for this question, in which the facility representative reported 25 tons as the normal outbound truck shipment.

For this industry, no further questions were answered.

Wholesale

Of the representatives who reported being part of the Wholesale Industry, the following businesses were reported:

- Personal care products.
- Oil seed sales.
- Coffee roaster.
- Outdoor equipment.

How Long Has This Facility Been in Its Current Location?

The number of years these facilities have been in their current location varies significantly. The following answers were received:

- One year.
- More than 40 years.
- Twelve years.
- 36 years.
- Facility has been in its current location since 1937 (82 years).
- Facility has been in its current location since 1982 (37 years), with expansions in 1989, 2001, and 2005.

How Large is Your Facility in Terms of Shipments?

Two representatives reported in terms of tons, in which the facility size in terms of shipments were reported to be 300 tons and 24,000 tons. Of the representatives who reported in terms of cwt., just one representative reported that their facility size in terms of shipments is 2.5 million cwt. Two representatives reported their size in terms of gallons, with 204 million and 8,000 million being the two sizes reported.

How Large is Your Facility in Terms of Storage Capacity?

One representative reported their storage capacity as 31,925 tons and one representative reported their storage capacity as 5,000 cwt. Two representatives reported their storage capacity as gallons, in which the reported sizes were 7.5 million gallons and 30,000 gallons. Two representatives were their storage capacity in terms of square feet, with the answers being 10,000 square feet and 80,000 square feet.

How Many Facilities Such as This One Does Your Firm Own and/or Operate?

All but one of the representatives reported having only one such facility, with the exception reporting that their firm owns or operates two such facilities.

How Many Employees (Including Yourself) Work at This Facility?

The range of employees reported by the surveyed representatives in the Wholesale Industry are as follows:

- 20 employees.
- 11 employees.
- 17 employees.
- 75 employees.
- 90 employees.
- 70 employees.

What is the Primary Commodity Received at This Location?

Of the top commodities reported by representatives who indicated they belong to the Wholesale Industry, top commodities include:

- Fatty acids, glycerin.
- Safflower, flax, and three different types of mustard seed.
- Green coffee.
- Sporting goods for the water.
- Petroleum.

Additional commodities received include:

- Preservatives.
- Soap.
- Tea.
- Aluminum pipes and fittings.

What is the Primary Commodity Produced/Shipped from This Location?

Primary commodities produced/shipped from this location for the Wholesale Industry type, as reported by the surveyed representatives, consist of the following:

- Lotion, cream, and shampoo.
- Roasted coffee.
- Sporting goods.
- Petroleum.
- Oils.

Additional commodities produced/shipped from this location include:

- Coffee and tea accessories and equipment.
- Grains.
- No other commodities.

At This Location, is There Loading/Unloading Capabilities for Truck and/or Rail?

Each representative who answered this question reported having loading and unloading capabilities for truck. As for rail, three representatives reported having such facilities for rail and three representatives reported not having such facilities for rail.

Specify the Locations of Origin for the Top Commodities of Inbound Freight

Being that the reported locations of origin for this commodity type are limited, the locations will be listed below (as opposed to presented on a map). Reported locations of origin include:

- Los Angeles, CA.
- New Jersey.
- Oregon.
- Salt Lake City, UT.
- All counties in southeastern Idaho (Twin Falls to Ashton).
- Northern Utah.
- Western half of Montana.
- Alberta, Canada.
- Saskatchewan, Canada.
- Manitoba, Canada.

No weights or distances were reported for these locations of origin of top commodities.

What Type of Facility is This Shipment Arriving From?

Of the two representatives who answered this question, one reported receiving this shipment from a warehouse or distribution center and the other reported receiving this shipment from farmers.

Best Describe the Route for Inbound Truck Shipments

One representative reported that rural interstates are the primary route for inbound truck shipments and one representative reported that all road types are used for inbound truck shipments. The two representatives did not provide specific routes.

How Large is the Normal Truck Shipment?

One representative reported that their normal truck shipment varies between 25 tons and 34 tons, while another reported that it “varies too much.”

How Many Truck Shipments do You Usually Receive?

One representative reporting receiving three truck shipments per day and one representative reported receiving 1,116 truck shipments per year.

Specify the Locations of Destination for the Top Commodities of Outbound Freight?

Being that the reported locations of origin for this commodity type are limited, the locations will be listed below (as opposed to be presented on a map). Reported locations of origin include:

- Los Angeles, CA.
- San Francisco, CA.
- Boise, ID.
- South America.
- Asia.
- Mexico.
- Central America.
- Asia.
- Europe.
- Canada.
- Every state in the United States except Alaska and Hawaii.

No mode or distances were provided for this question.

What Type of Facility is This Shipment Going to?

One representative reported that this shipment is headed to a warehouse or distribution center and one representative reported that shipment is headed to product cleaning.

Best Describe the Route for Outbound Truck Shipments

One representative reported that rural interstates are the primary route for inbound truck shipments and one representative reported that all road types are used for inbound truck shipments. The two representatives did not provide specific routes.

How Large is the Normal Truck Shipment?

One representative answered this question and reported that their normal outbound truck shipment consists of 22 tons to 25 tons of product.

How Many Trucks Shipments do You Usually Make?

One representative reported making three truck shipments per week and one representative reported making 829 truck shipments per year, in addition to rail shipments. The frequency of rail shipments was not disclosed.

What Times of Year do Inbound Shipments Most Often Arrive at This Location?

Only one representative answered this question and reported that September to November is the time of year that inbound shipments most often arrive at this location.

What Times of Year do Outbound Shipments Most Often Leave This Location?

Again, only one representative answered this question and reported that September to November is the time of year that outbound shipments most often leave this location.

Remaining Industry Types

Of the remaining industry types, survey respondents only reported their industry type and failed to answer the succeeding questions in the survey. As such, a summary of these industry types will not be presented.

Information on Freight Supply Chains in Idaho from EROAD Data Records

The following subsections will present, by industry type, supply-chains that run through Idaho. Industries that have supply-chains running through Idaho include the following:

- Accommodation and Food Services.
- Aggregates.
- Arts and Recreation Services.
- Construction.
- Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services.
- Food, Beverage, and Tobacco Product Manufacturing.
- Forestry and Logging.
- General Freight.
- General Haulage.
- Horticulture.
- Mining.
- Other Agriculture.
- Other Services.
- Owner-Occupied Property Operation (National Accounts Only).
- Private Transport.
- Refrigerated Haulage.
- Rental, Hiring, and Real Estate Services.
- Retail Trade.

- Steel and Aluminum.
- Transport Equipment, Machinery and Equipment Manufacturing.
- Wood and Paper Products Manufacturing.

Accommodation and Food Services

Figure 55 shows the supply-chains for Accommodation and Food Services through Idaho. As observed, the supply-chains running through Idaho are from neighboring states.

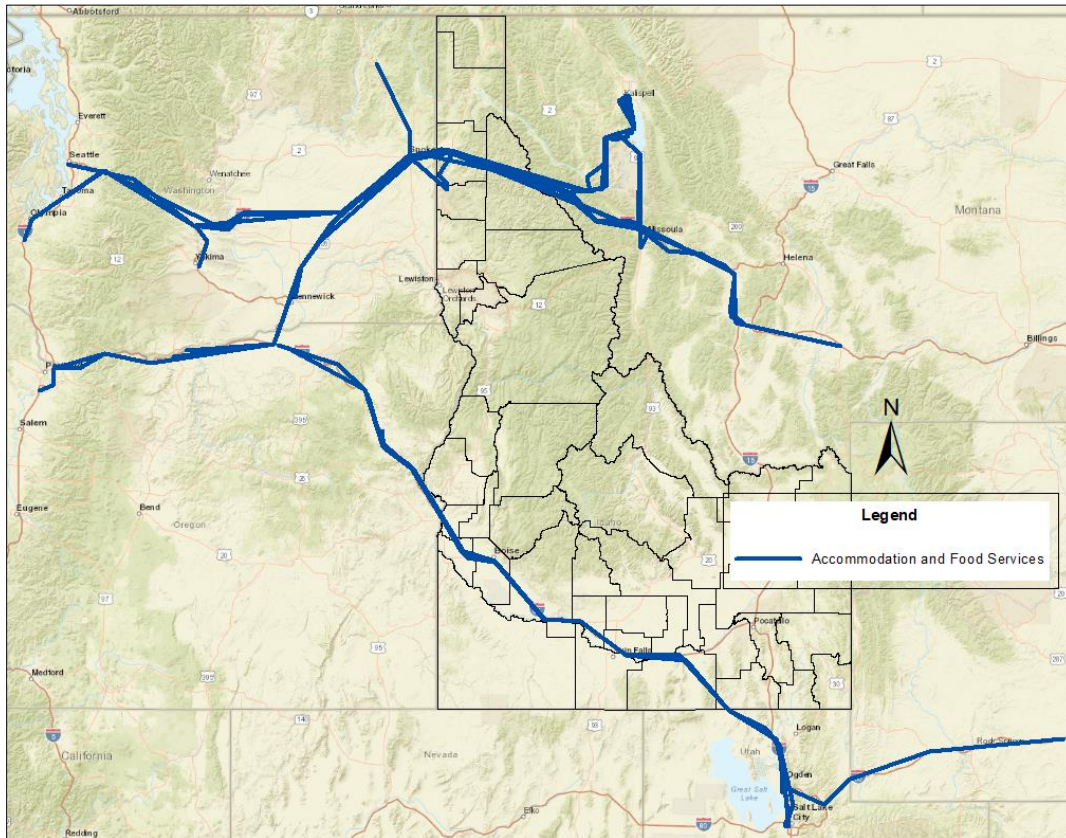


Figure 55. Accommodation and Food Services Supply-Chains through Idaho



Figure 56. Aggregates Supply-Chains through Idaho

Arts and Recreation Services

Figure 57 shows the Arts and Recreation Services supply-chains through Idaho.

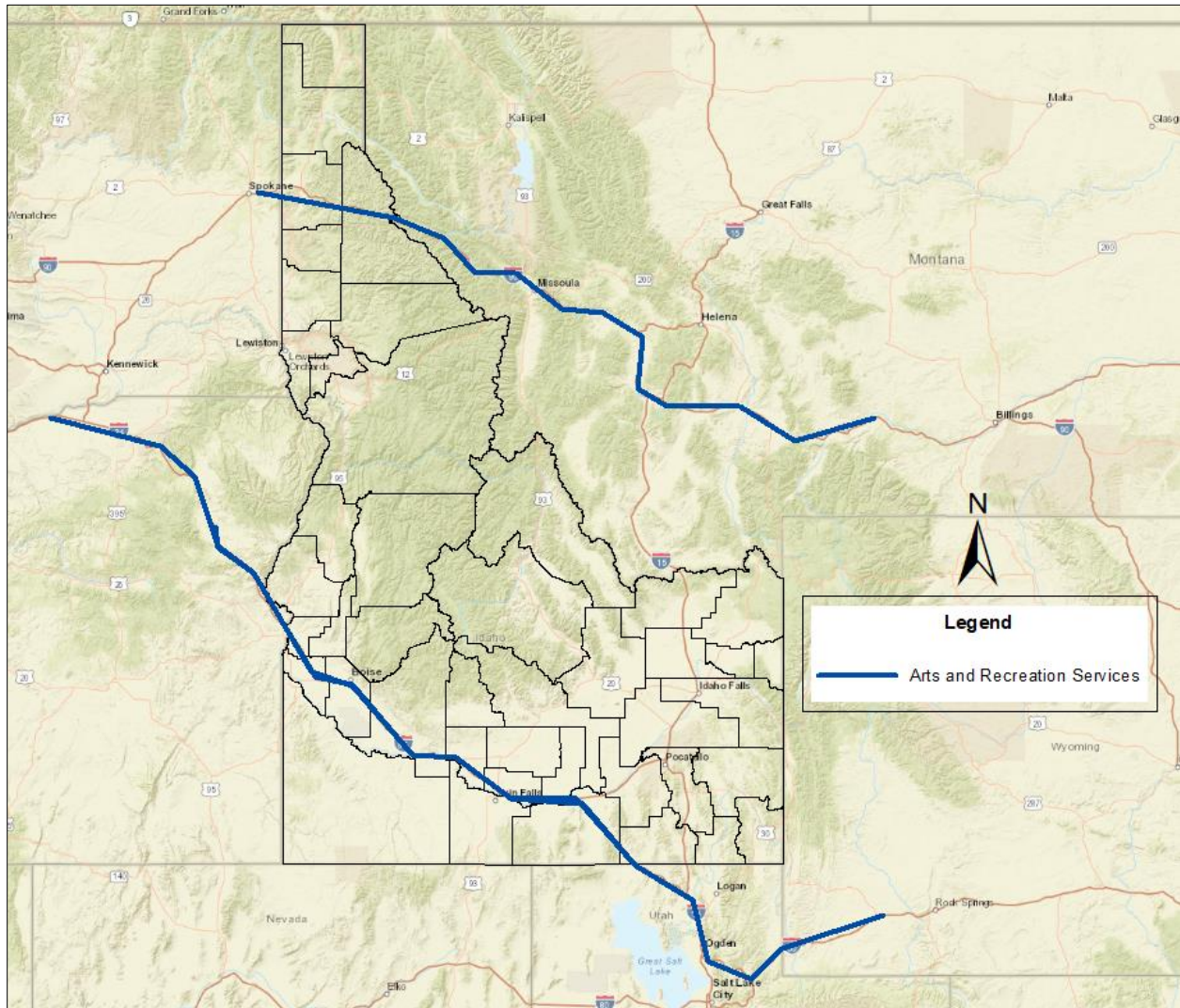


Figure 57. Arts and Recreation Services Supply-Chains through Idaho



Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services

Figure 59 shows the Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services supply-chains through Idaho.

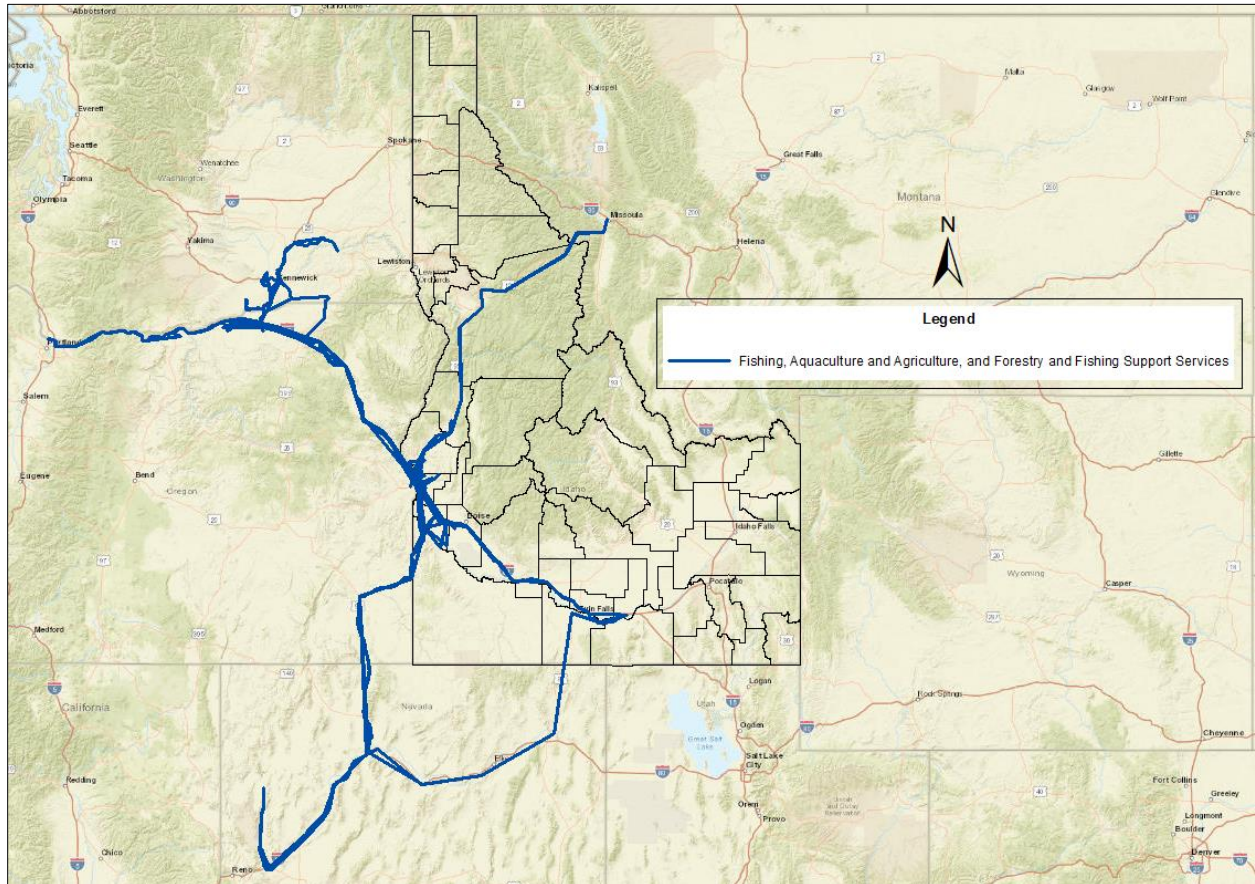


Figure 59. Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Supply-Chains through Idaho

Food, Beverage, and Tobacco Product Manufacturing

Figure 60 illustrates the Food, Beverage, and Tobacco Product Manufacturing supply-chains through Idaho.

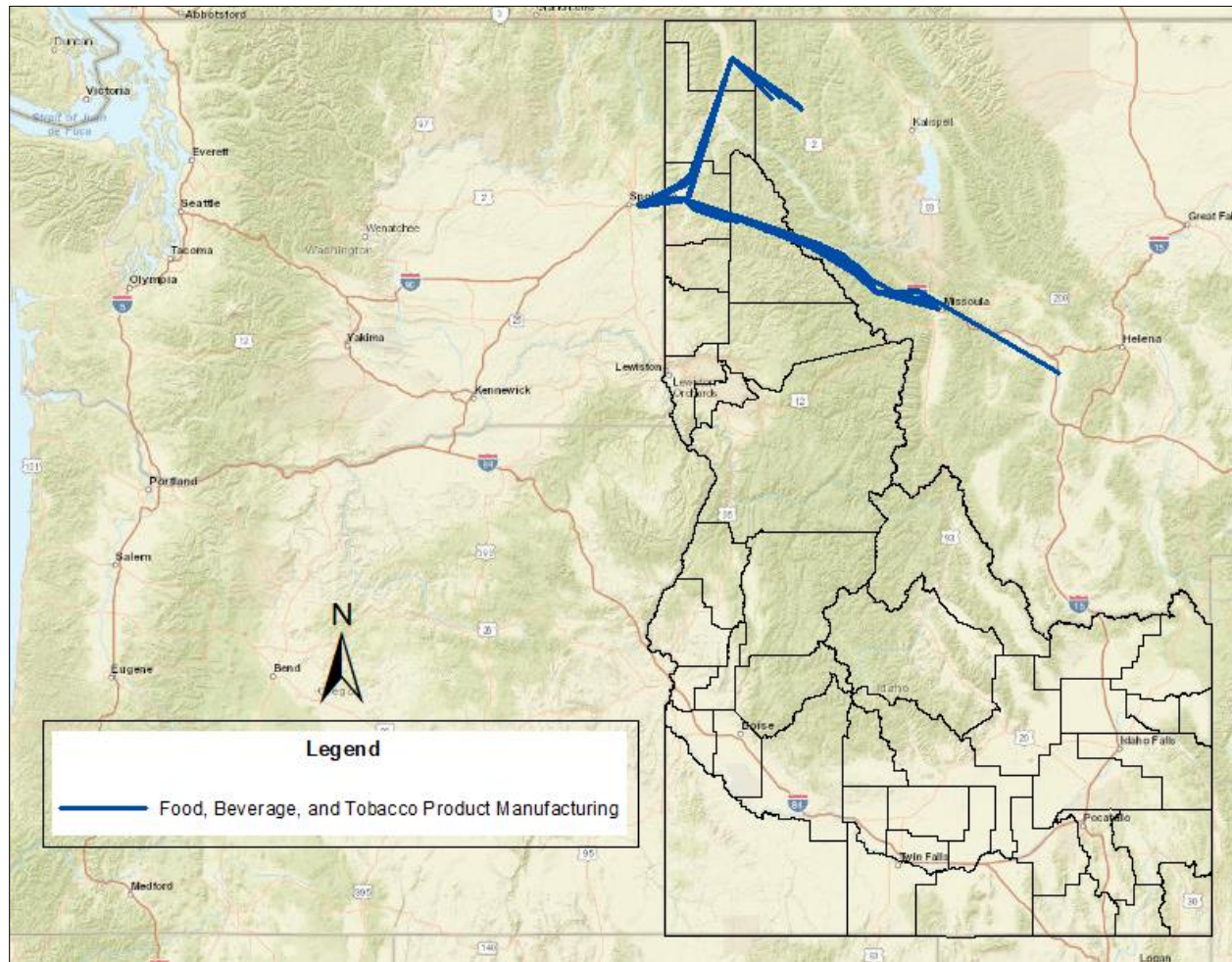


Figure 60. Food, Beverage, and Tobacco Product Manufacturing Supply-Chains through Idaho

Forestry and Logging

Figure 61 shows the Forestry and Logging supply-chains through Idaho.

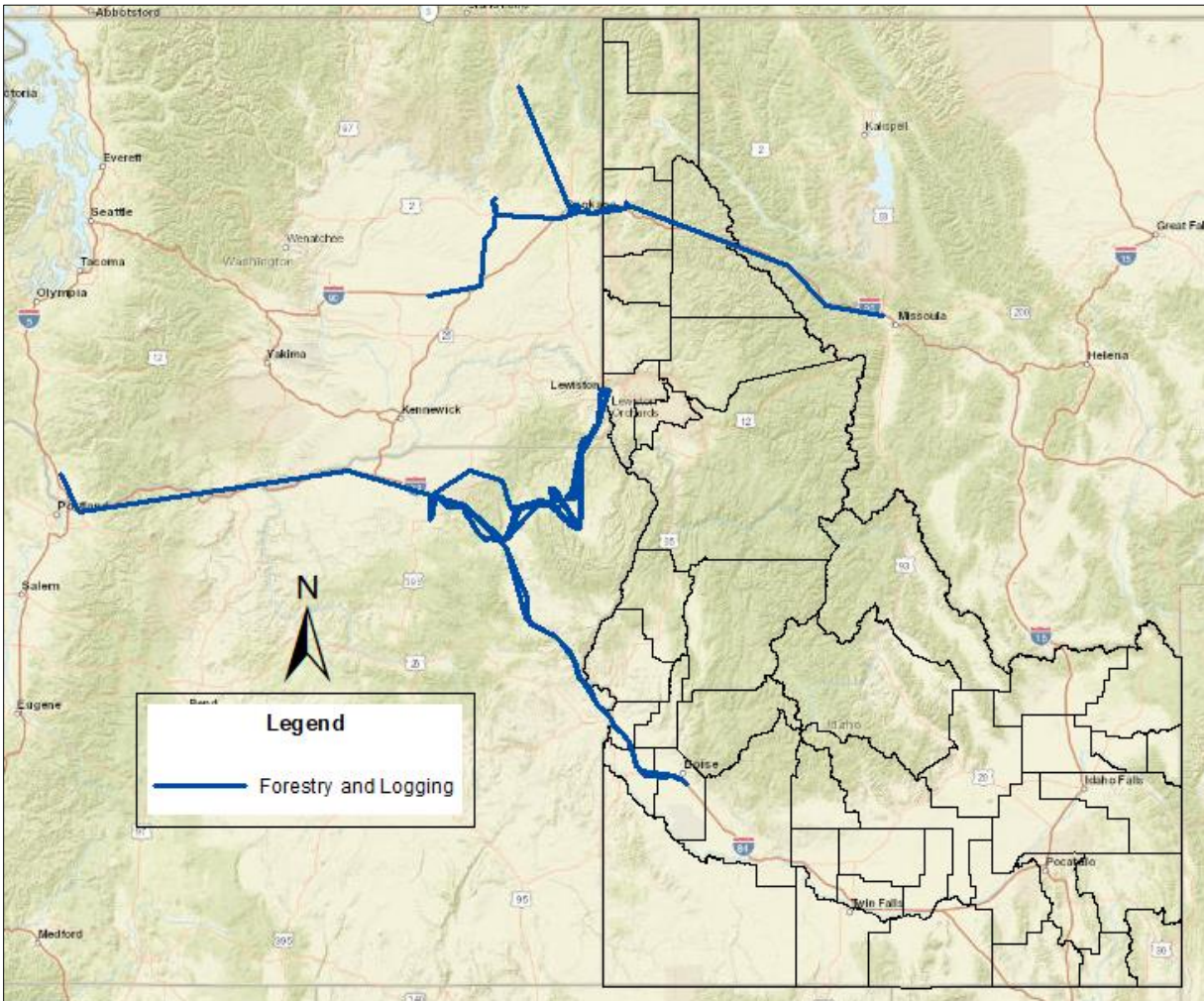


Figure 61. Forestry and Logging Supply-Chains through Idaho

General Freight

Figure 62 shows the General Freight supply-chains through Idaho.



Figure 62. General Freight Supply-Chains through Idaho

General Haulage

Figure 63 illustrates the General Haulage supply-chains through Idaho.



Figure 63. General Haulage Supply-Chains through Idaho

Figure 64 shows the Horticulture supply-chains through Idaho.



Mining

Figure 65 shows the Mining supply-chains through Idaho.

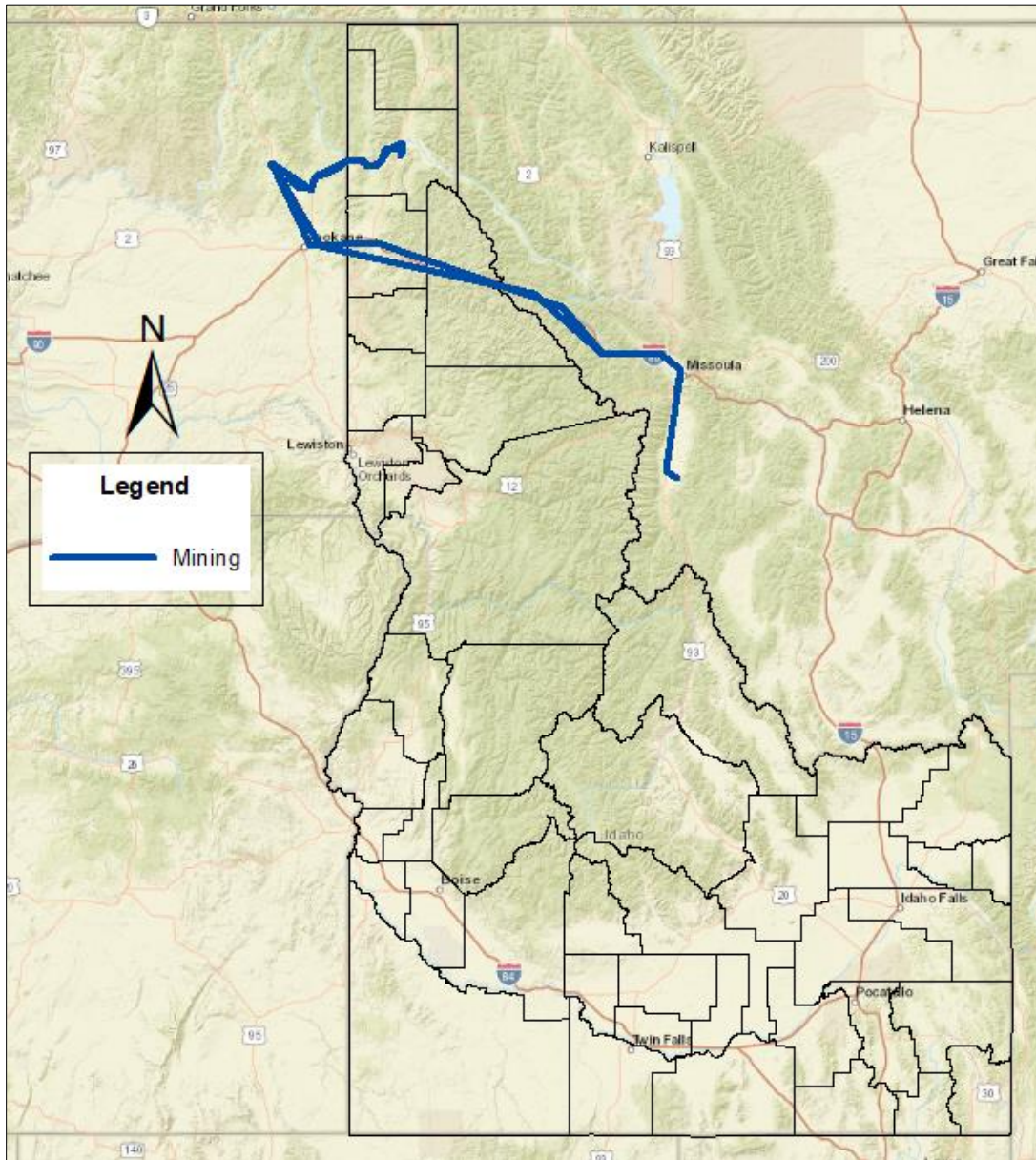


Figure 65. Mining Supply-Chains through Idaho

Other Agriculture

Figure 66 shows the Other Agriculture supply-chains through Idaho.

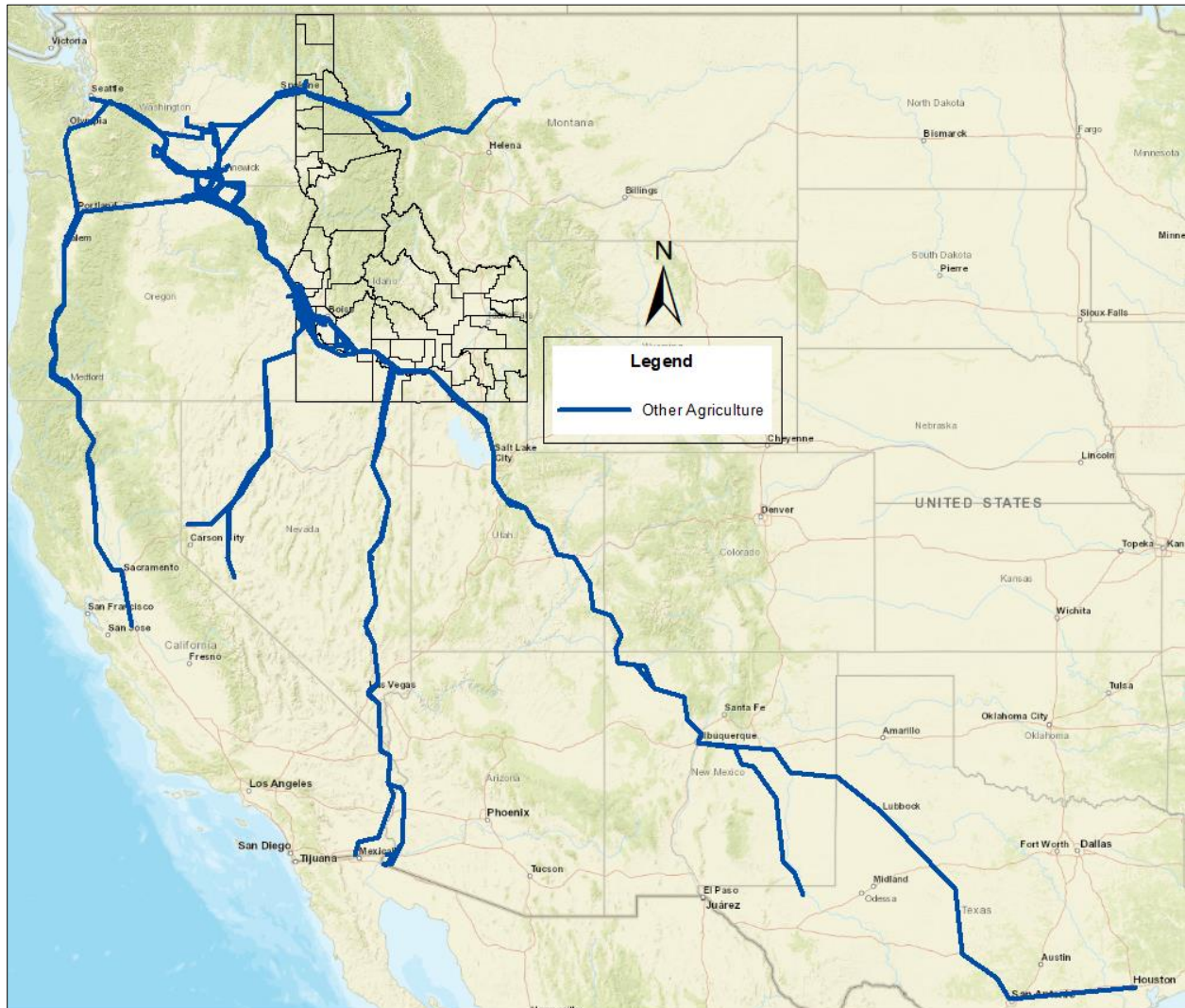


Figure 66. Other Agriculture Supply-Chains through Idaho

Other Services

Figure 67 shows the Other Services supply-chains through Idaho.

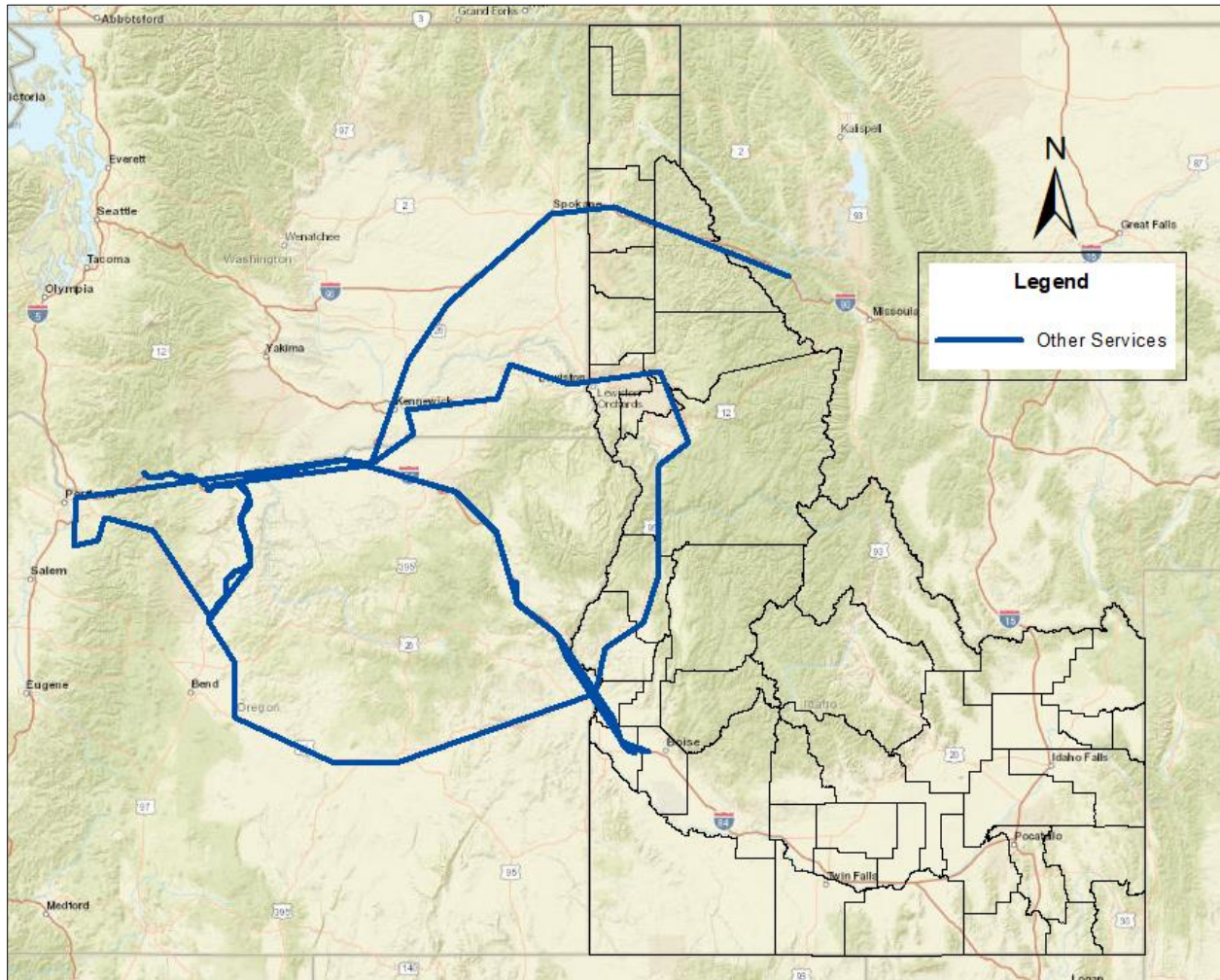


Figure 67. Other Services Supply-Chains through Idaho

Owner-Occupied Property Operation (National Accounts Only)

Figure 68 shows Owner-Occupied Property Operation (National Accounts Only) supply-chains through Idaho.

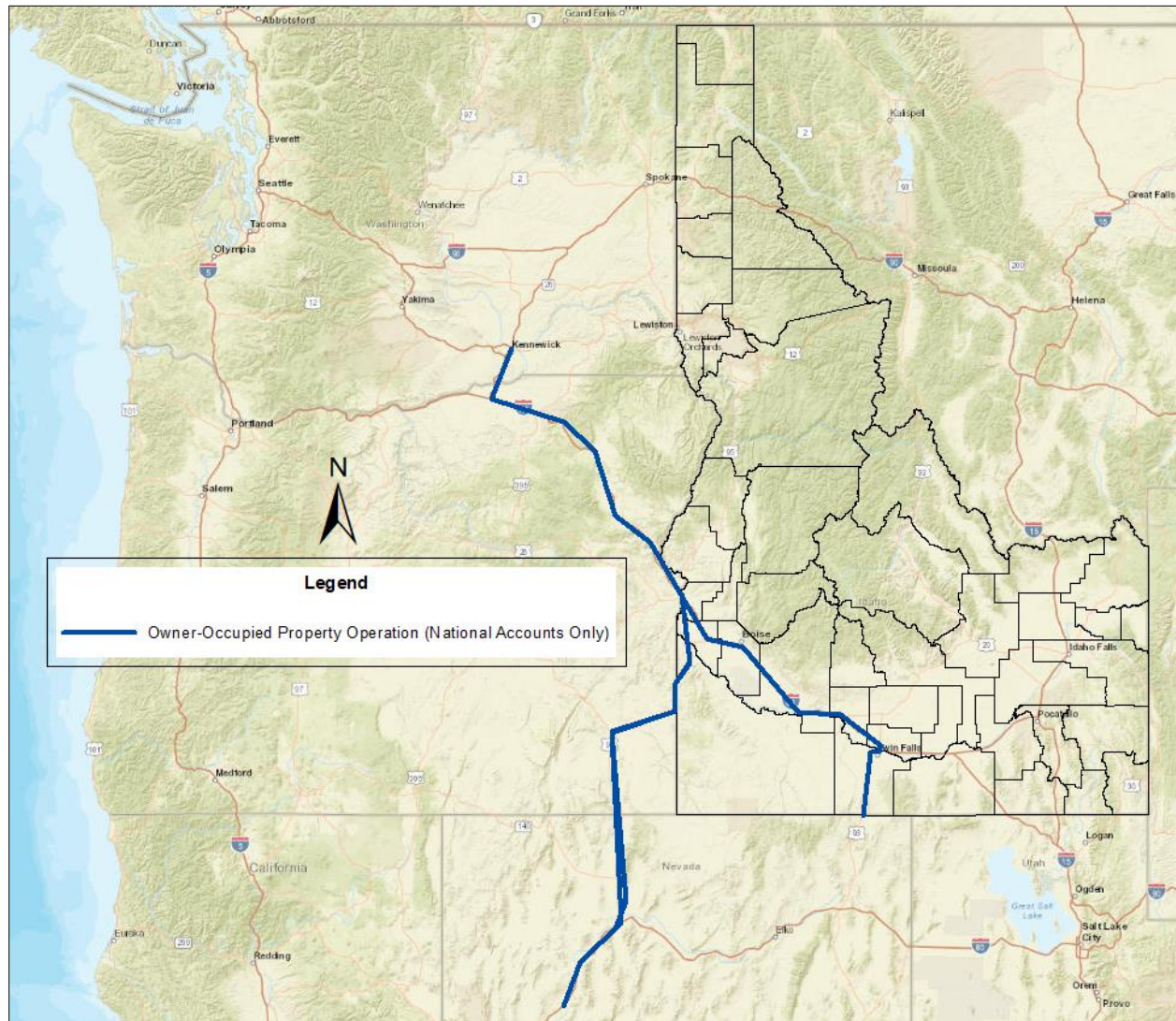


Figure 68. Owner-Occupied Property Operation (National Accounts Only) Supply-Chains through Idaho

Private Transport

Figure 69 shows the Private Transport supply-chains through Idaho.



Figure 69. Private Transport Supply-Chains through Idaho

Figure 70 shows the Refrigerated Haulage supply-chains through Idaho.



Figure 70. Refrigerated Haulage Supply-Chains through Idaho

Rental, Hiring, and Real Estate Services

Figure 71 shows the Rental, Hiring, and Real Estate Services supply-chains through Idaho.

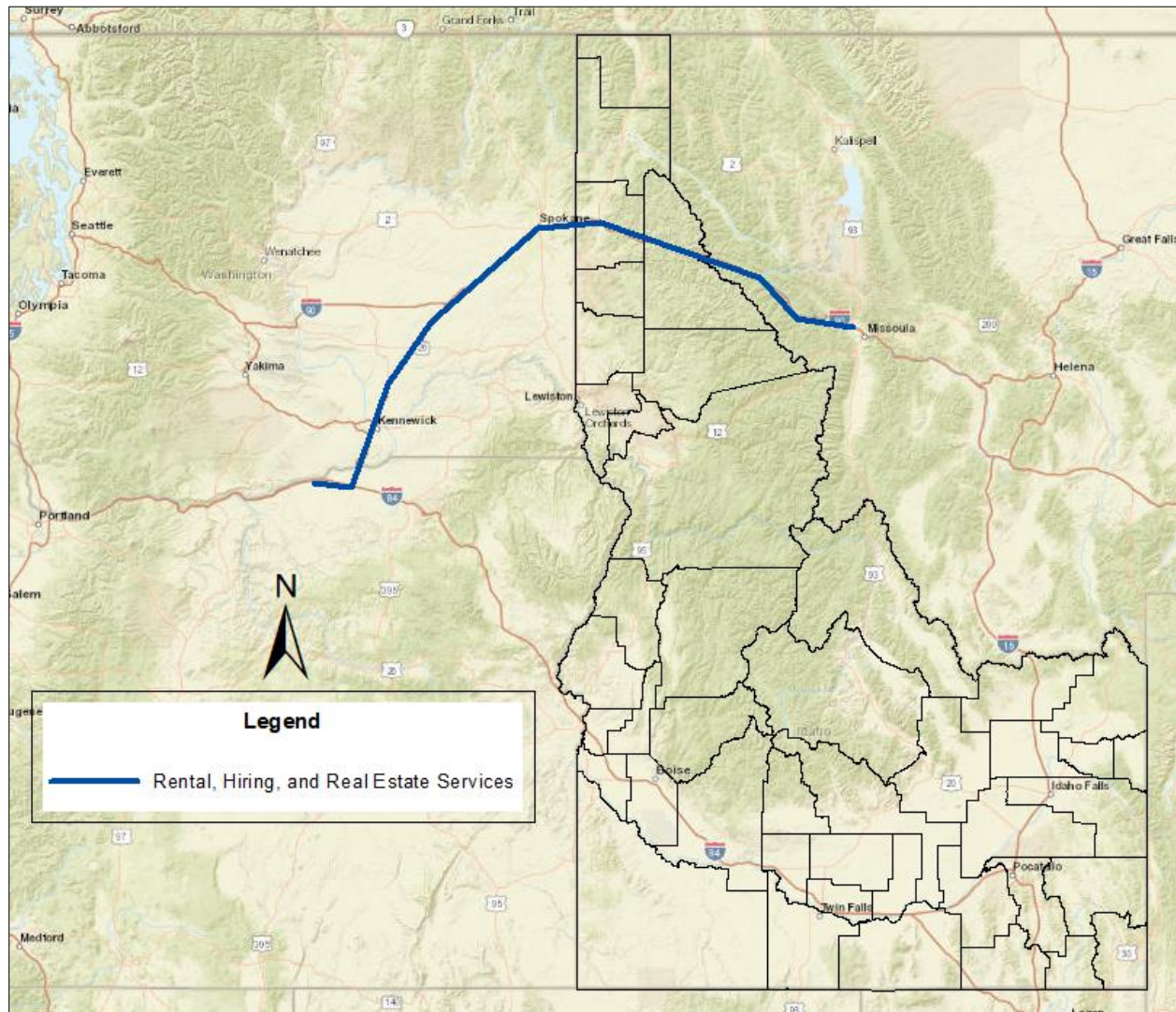


Figure 71. Rental, Hiring, and Real Estate Services Supply-Chains through Idaho

Retail Trade

Figure 72 shows the Retail Trade supply-chains through Idaho.

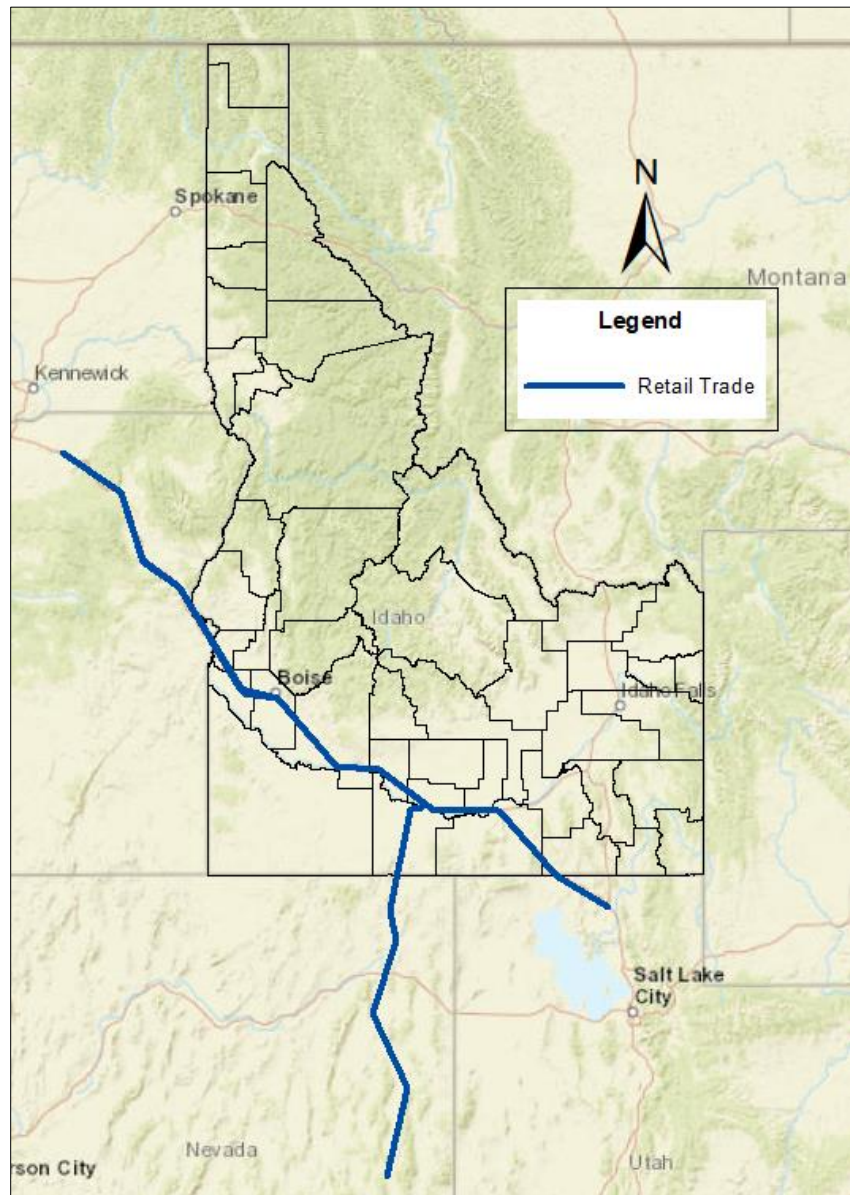


Figure 72. Retail Trade Supply-Chains through Idaho

Steel and Aluminum

Figure 73 shows the Steel and Aluminum supply-chains through Idaho.



Figure 73. Steel and Aluminum Supply-Chains through Idaho

Transport Equipment, Machinery and Equipment Manufacturing

Figure 74 shows the Transport Equipment, Machinery and Equipment Manufacturing supply-chains through Idaho.

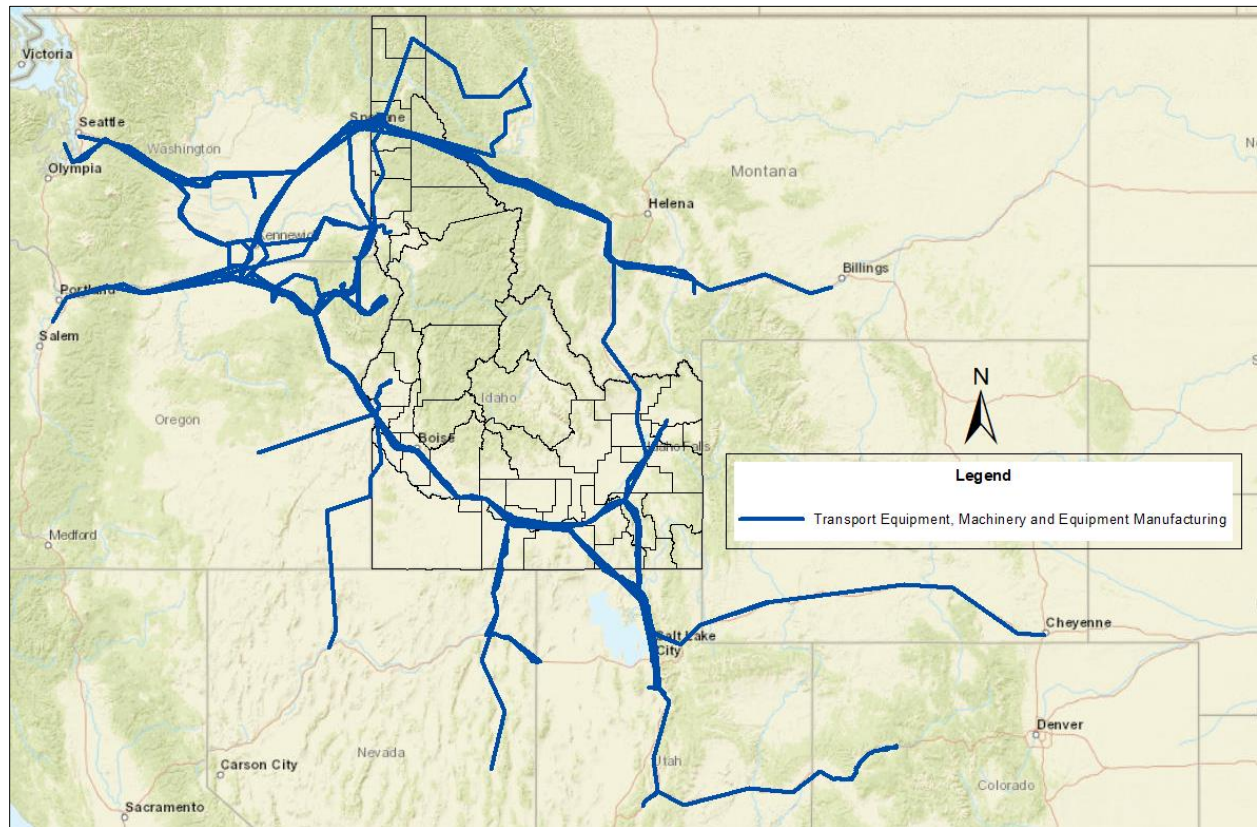


Figure 74. Transport Equipment, Machinery and Equipment Manufacturing Supply-Chains through Idaho

Wood and Paper Products Manufacturing

Figure 75 shows the Wood and Paper Products Manufacturing supply-chains through Idaho.

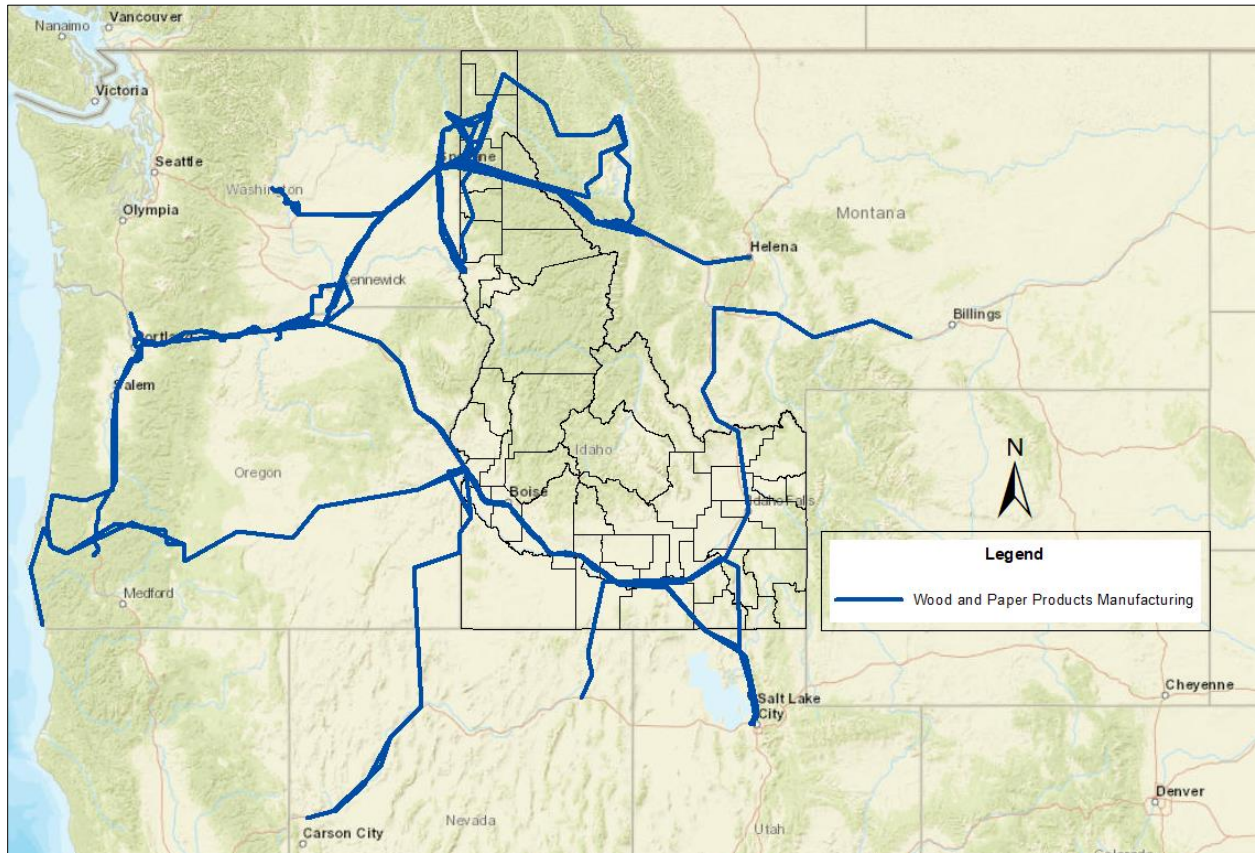


Figure 75. Wood and Paper Products Manufacturing Supply-Chains through Idaho

Information on Freight Shipments Originating in Idaho from EROAD Data

This section will present freight shipments by industry type originating at facilities in Idaho. Industries shipping freight from Idaho include:

- Accommodation and Food Services.
- Aggregates.
- Arts and Recreation Services.
- Construction.
- Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services.
- Food, Beverage, and Tobacco Product Manufacturing.
- Forestry and Logging.
- General Freight.
- General Haulage.
- Horticulture.
- Mining.
- Other Agriculture.
- Other Services.
- Owner-Occupied Property Operation (National Accounts Only).
- Private Transport.
- Refrigerated Haulage.
- Rental, Hiring, and Real Estate Services.
- Retail Trade.
- Steel and Aluminum.
- Transport Equipment, Machinery and Equipment Manufacturing.
- Transport, Postal and Warehousing.
- Wood and Paper Products Manufacturing.

The distribution of freight shipments, by industry, originating in Idaho is shown in Figure 76. The top two industry types account for greater than 60 percent of EROAD records:

- Food, Beverage, and Tobacco Product Manufacturing (40.6 percent).
- General Freight (23.7 percent).

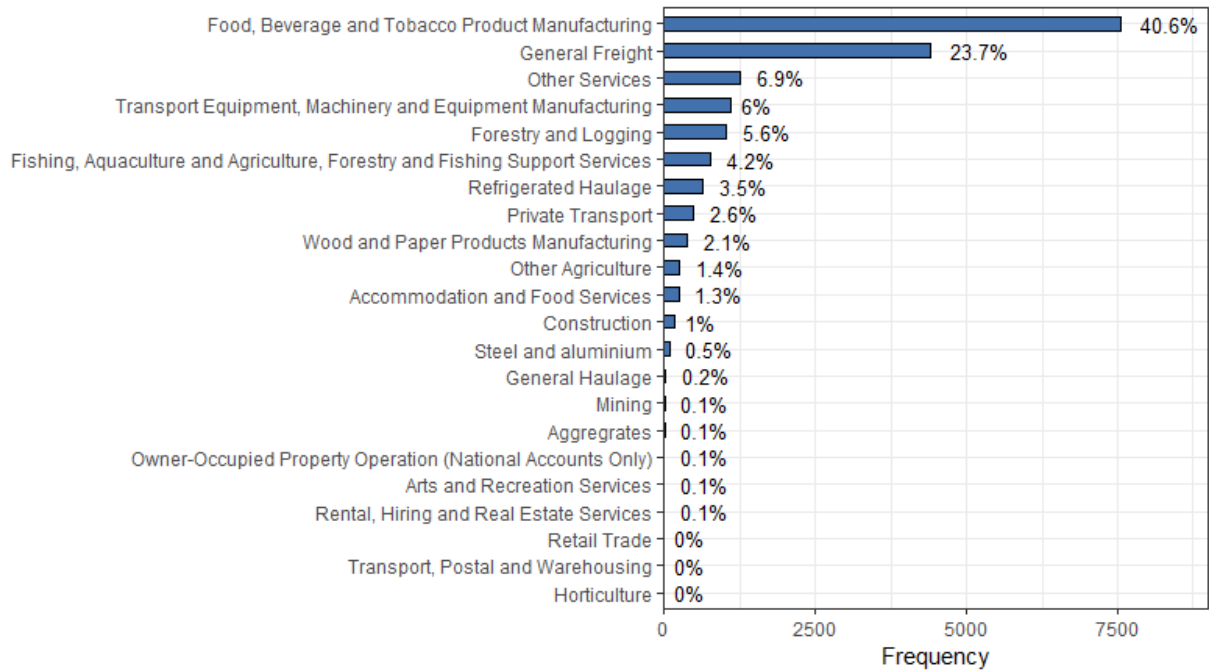


Figure 76. Proportion of Industry Types Originating From Idaho Per EROAD Data

These industries shipping goods from Idaho are destined to a range of locations, including the following:

- Alberta, Canada.
- Arizona.
- British Columbia.
- California.
- Colorado.
- Idaho.
- Illinois.
- Indiana.
- Iowa.
- Michigan.
- Missouri.
- Montana.
- Nebraska.
- Nevada.
- New Mexico.
- North Dakota.
- Oregon.
- Tennessee.
- Utah.
- Washington.
- Wyoming.

Accommodation and Food Services

Figure 77 shows Accommodation and Food Services shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 78 . In addition, GVW distribution of outbound shipments is observed in Figure 79.

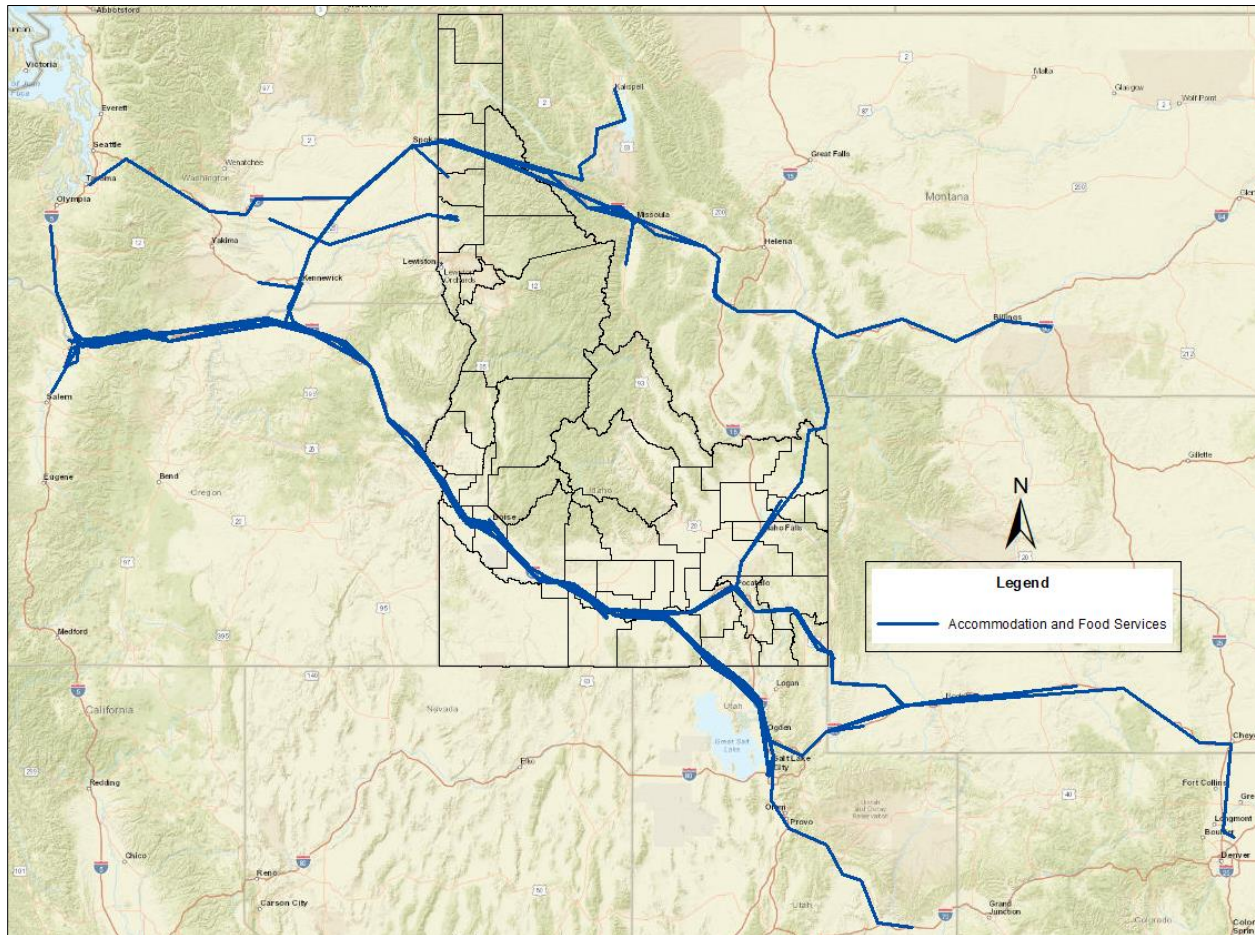


Figure 77. Accommodation and Food Services Shipments Originating in Idaho

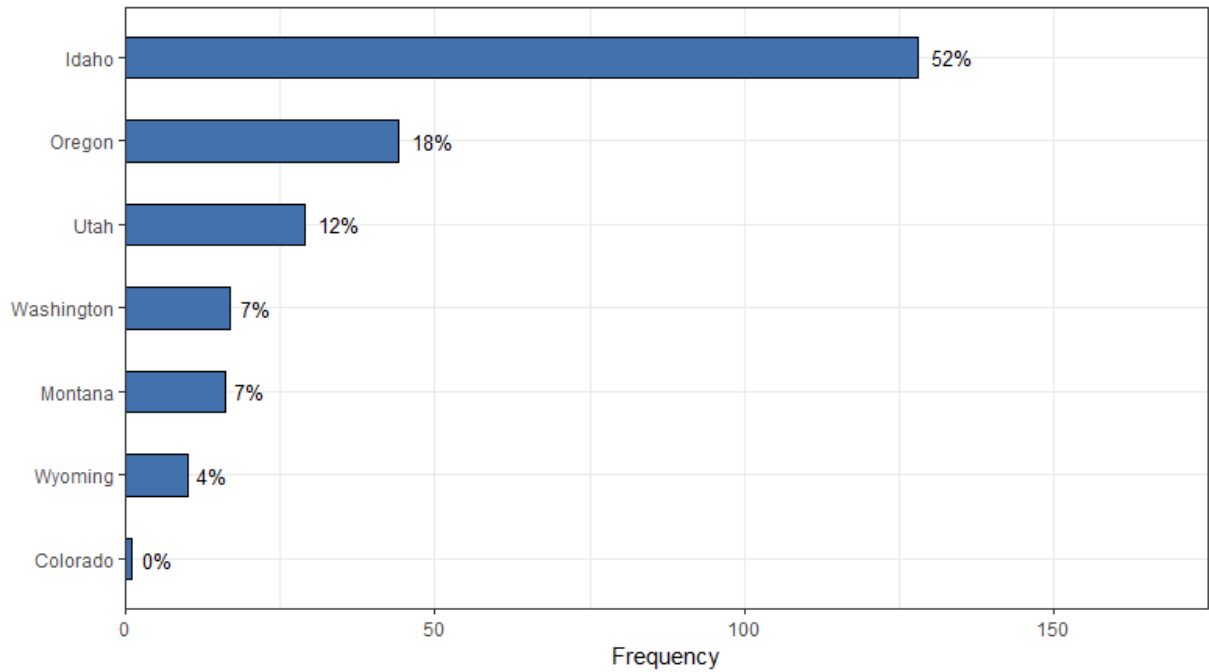


Figure 78. Destination States for Accommodation and Food Services Shipments Originating in Idaho

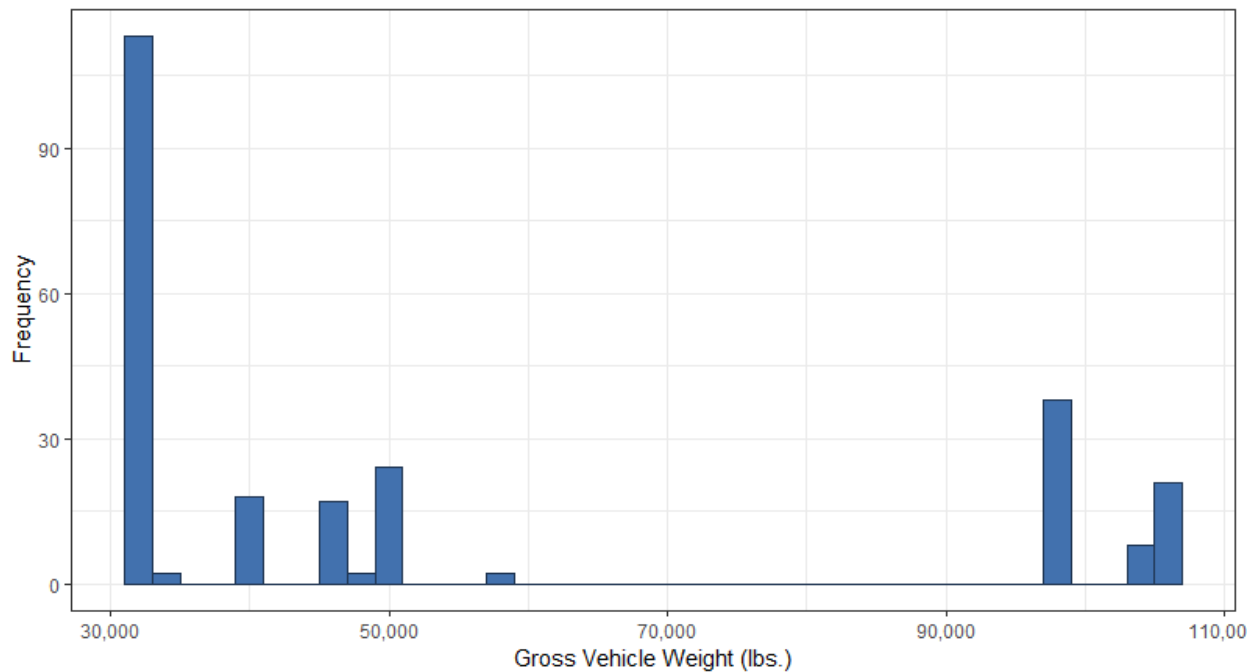


Figure 79. GVW Distribution of Accommodation and Food Services Shipments Originating in Idaho

Aggregates

Figure 80 shows Aggregates shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 81. In addition, GVW distribution of outbound shipments is observed in Figure 82 .

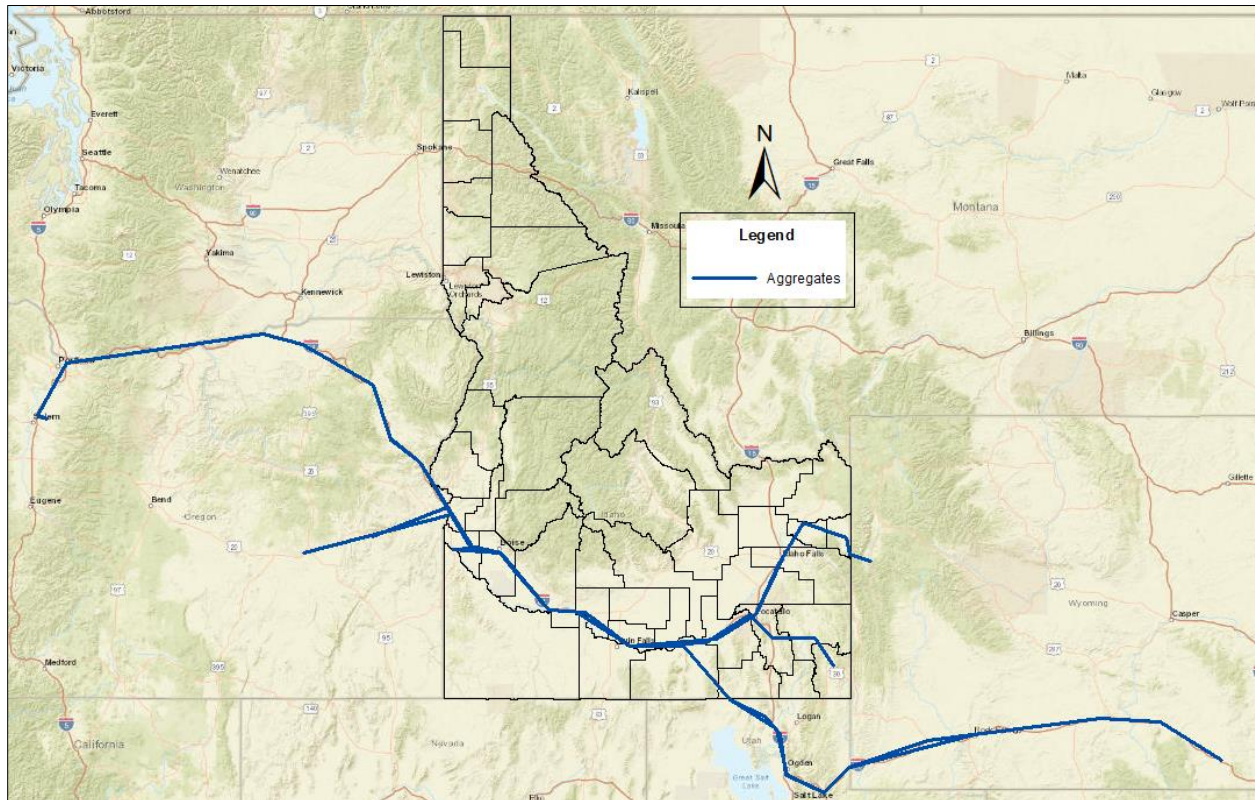


Figure 80. Aggregates Shipments Originating in Idaho

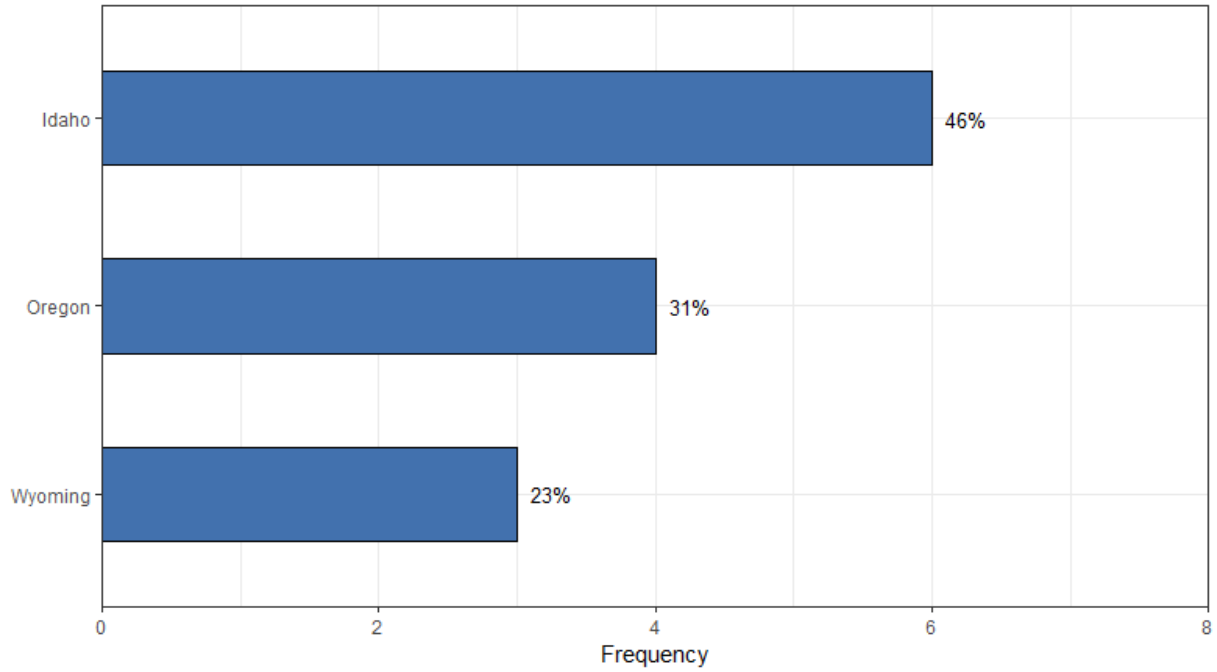


Figure 81. Destination States for Aggregate Shipments Originating in Idaho

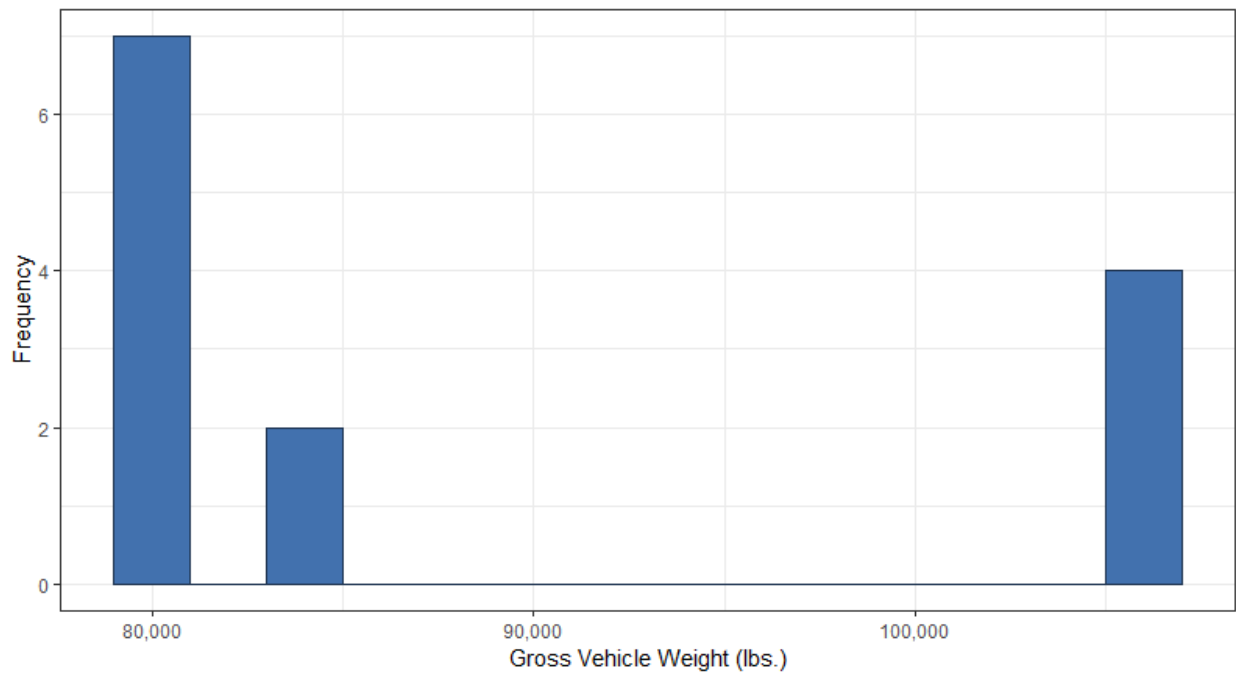


Figure 82. GVW Distribution of Aggregate Shipments Originating in Idaho

Arts and Recreation Services

Figure 83 shows Arts and Recreation Services shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 84. According to EROAD records, each shipment had a recorded GVW of 51,000 pounds.

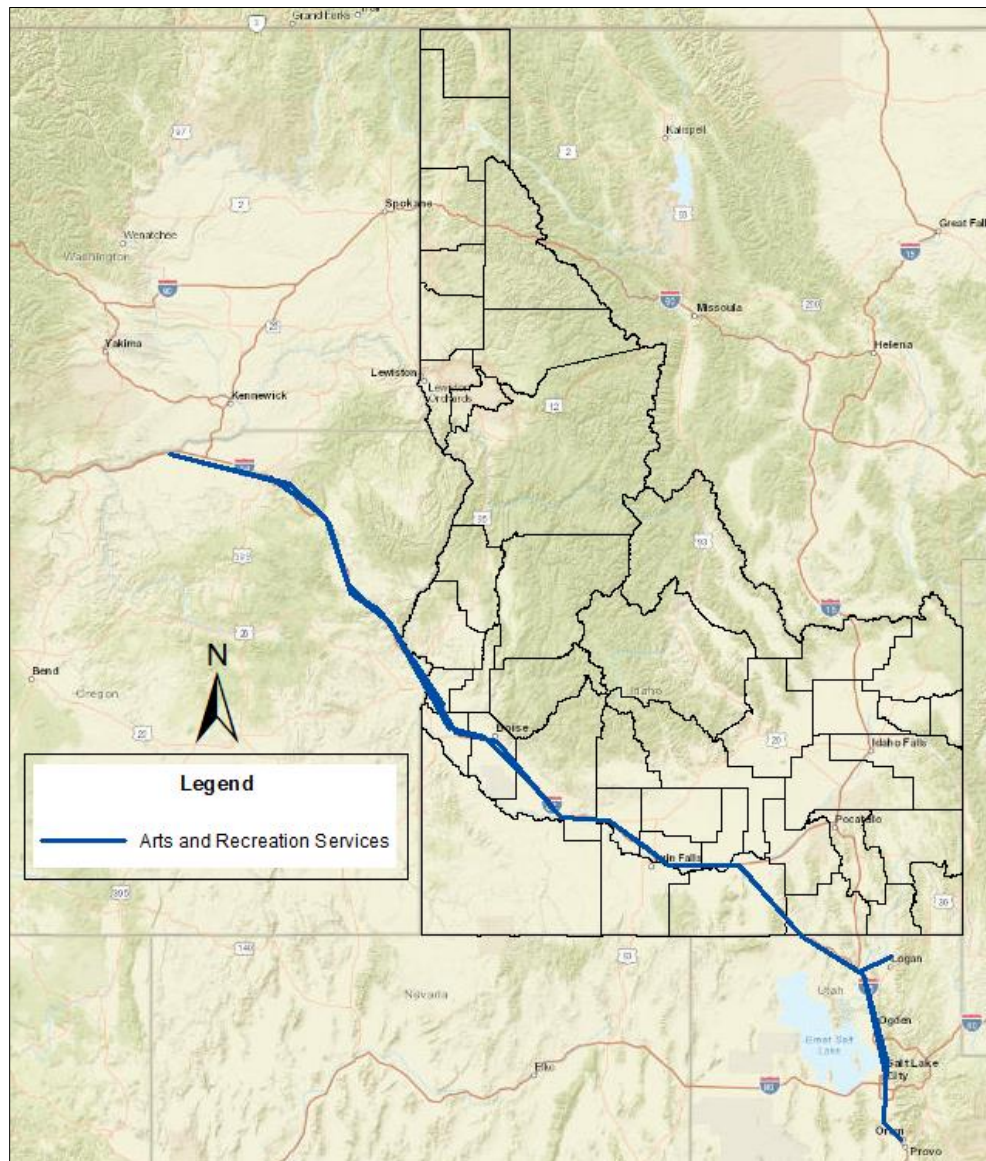


Figure 83. Arts and Recreation Services Shipments Originating in Idaho

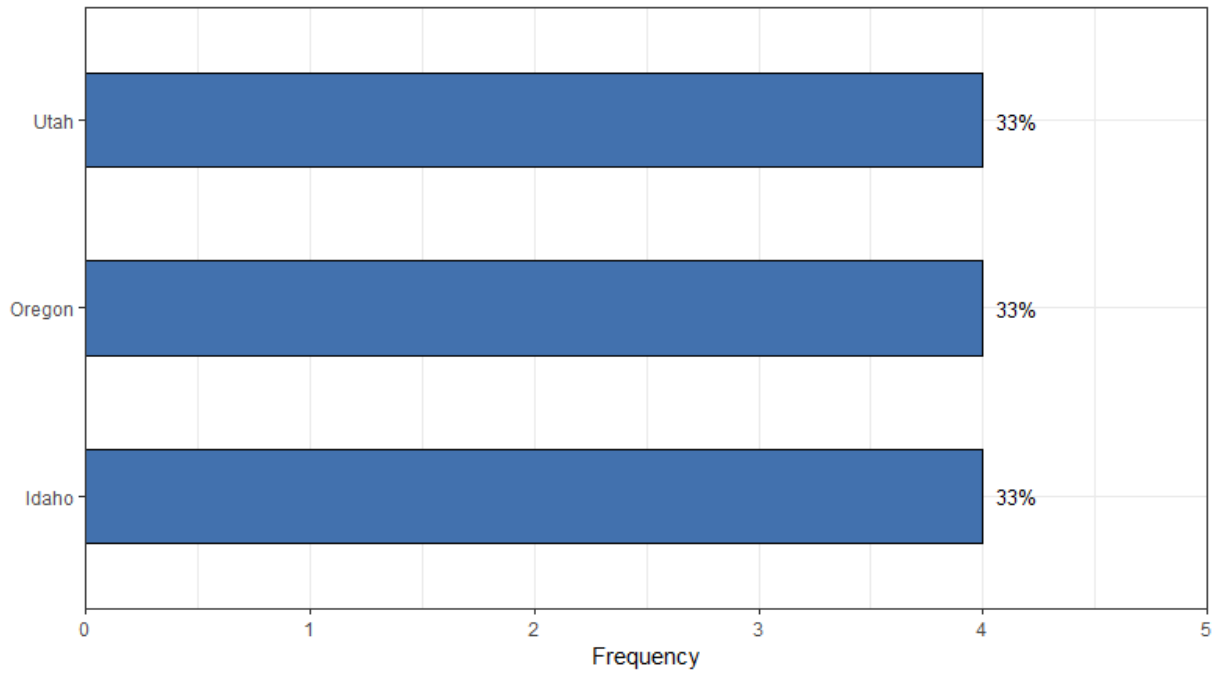


Figure 84. Destination States for Arts and Recreations Services Shipments Originating in Idaho

Construction

Figure 85 shows Construction shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 86. In addition, GVW distribution of outbound shipments is observed in Figure 87.

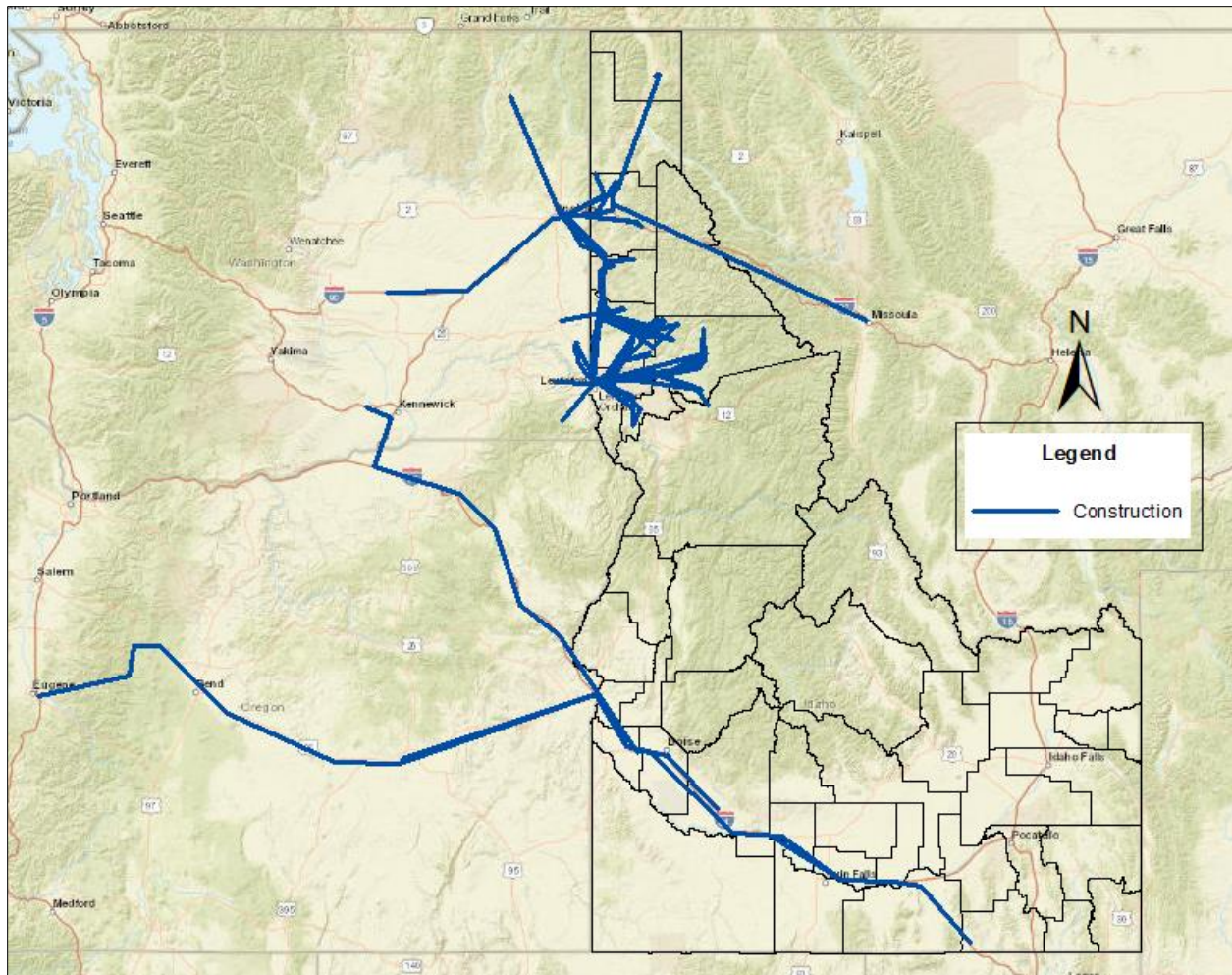


Figure 85. Construction Shipments Originating in Idaho

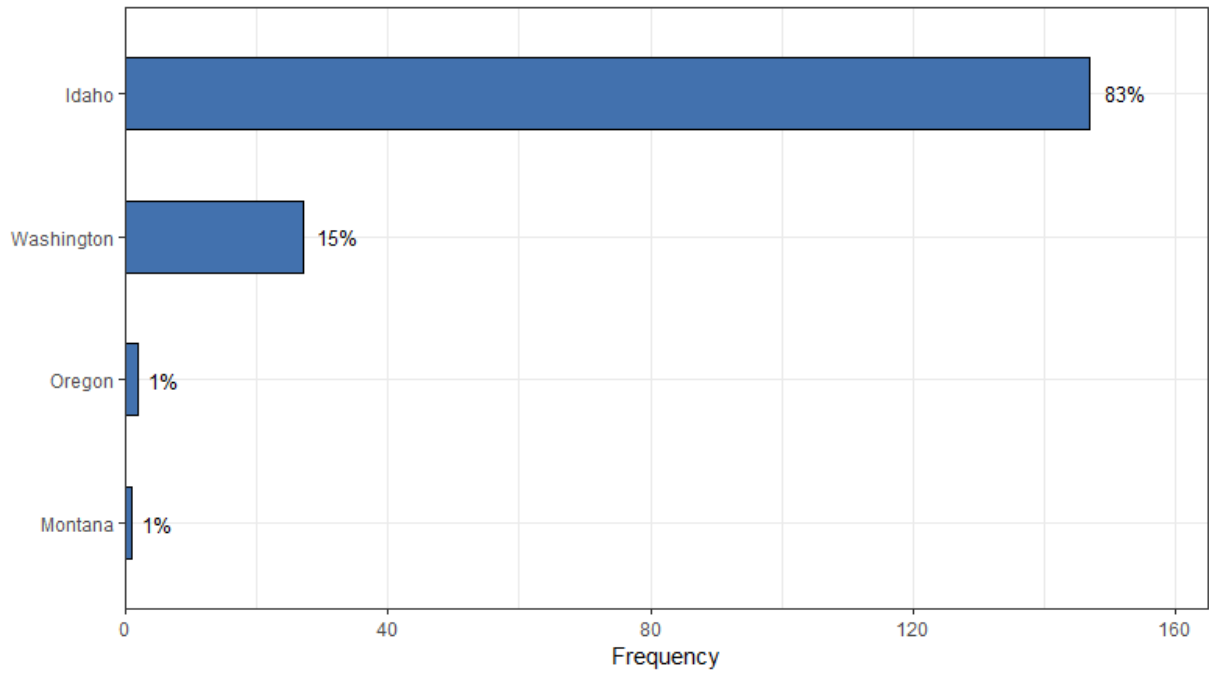


Figure 86. Destination States for Construction Shipments Originating in Idaho

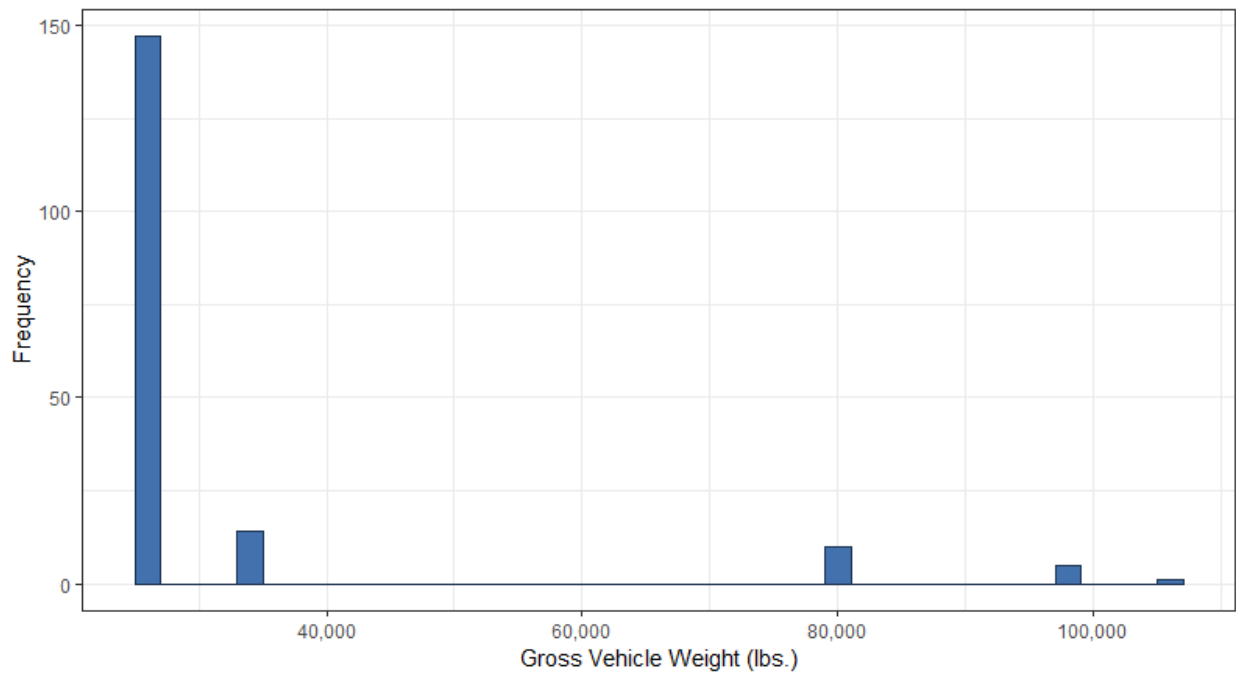


Figure 87. GVW Distribution of Construction Shipments Originating in Idaho

Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services

Figure 88 shows Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 89. In addition, GVW distribution of outbound shipments is observed in Figure 90 .

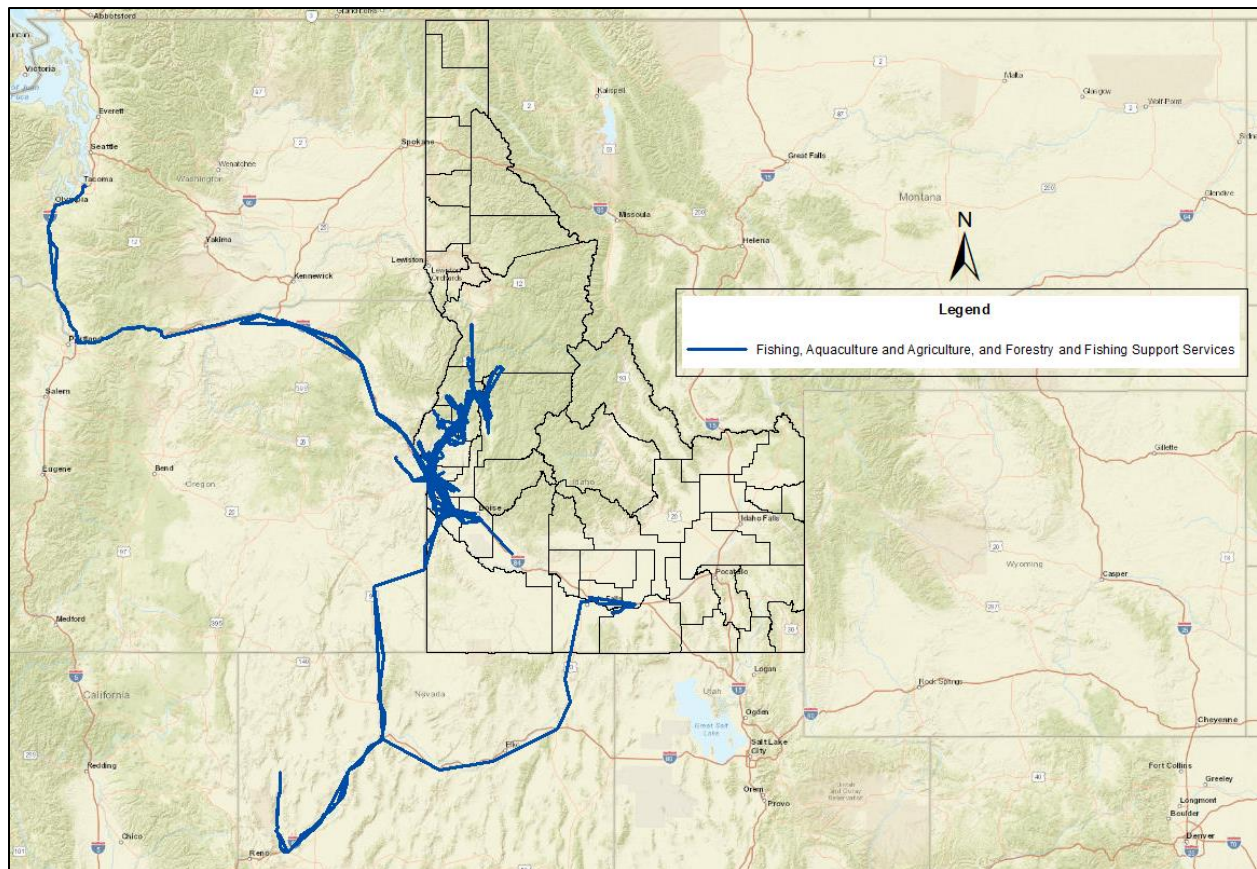


Figure 88. Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Originating in Idaho

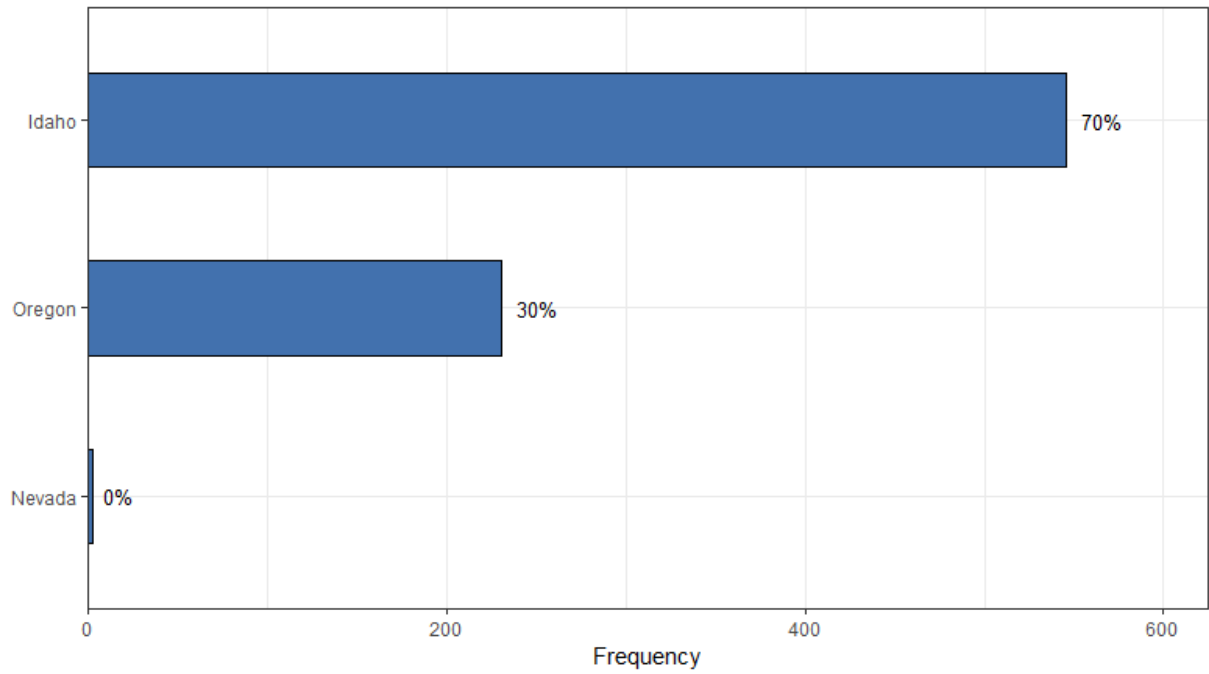


Figure 89. Destination States for Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Originating in Idaho

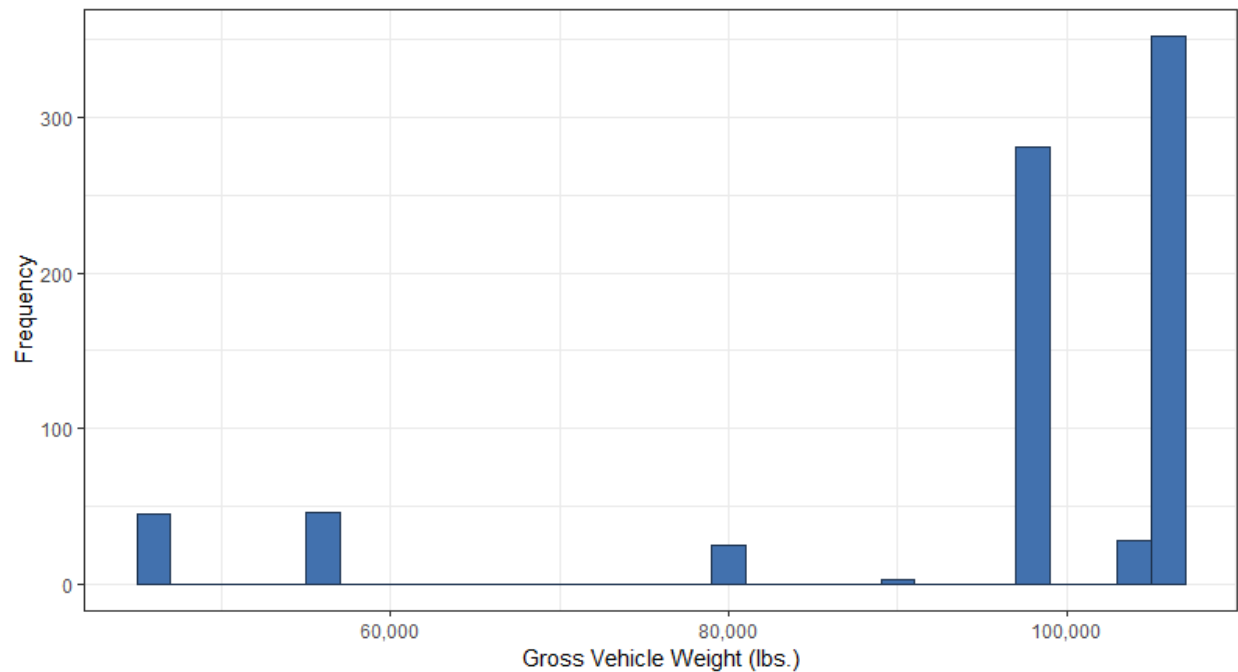


Figure 90. GVW Distribution of Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Originating in Idaho

Food, Beverage, and Tobacco Product Manufacturing

Figure 91 shows Food, Beverage, and Tobacco Product Manufacturing shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 92. In addition, GVW distribution of outbound shipments is observed in Figure 93.



Figure 91. Food, Beverage, and Tobacco Product Manufacturing Shipments Originating in Idaho

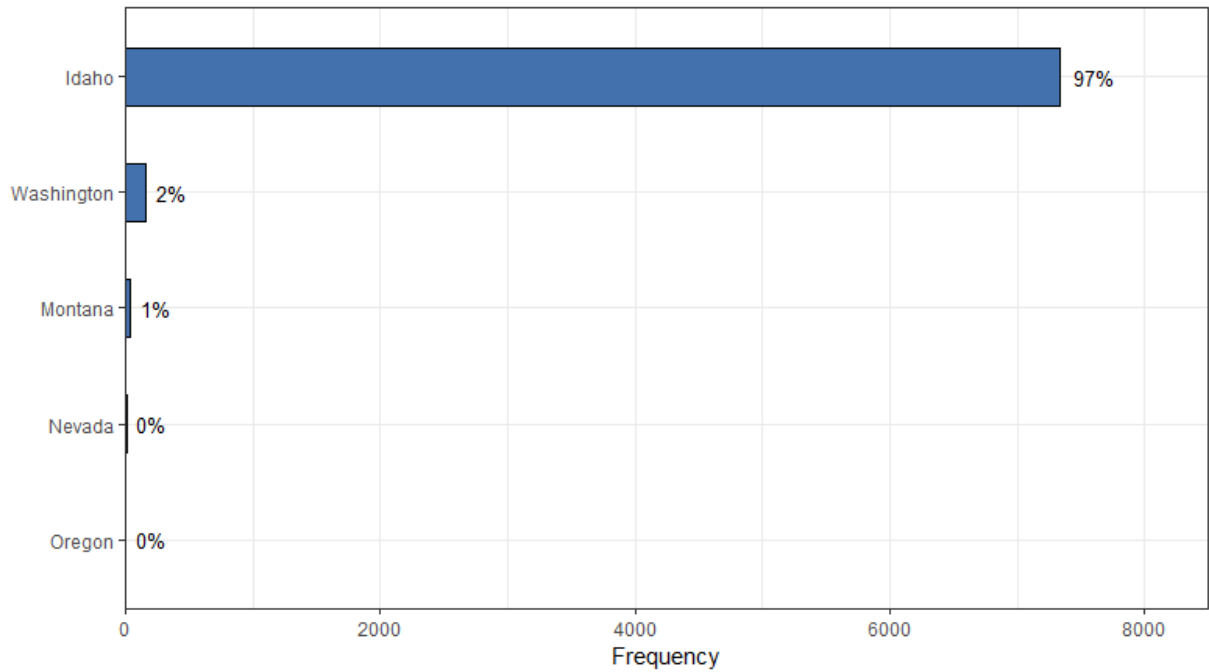


Figure 92. Destination States for Food, Beverage, and Tobacco Product Manufacturing Shipments Originating in Idaho

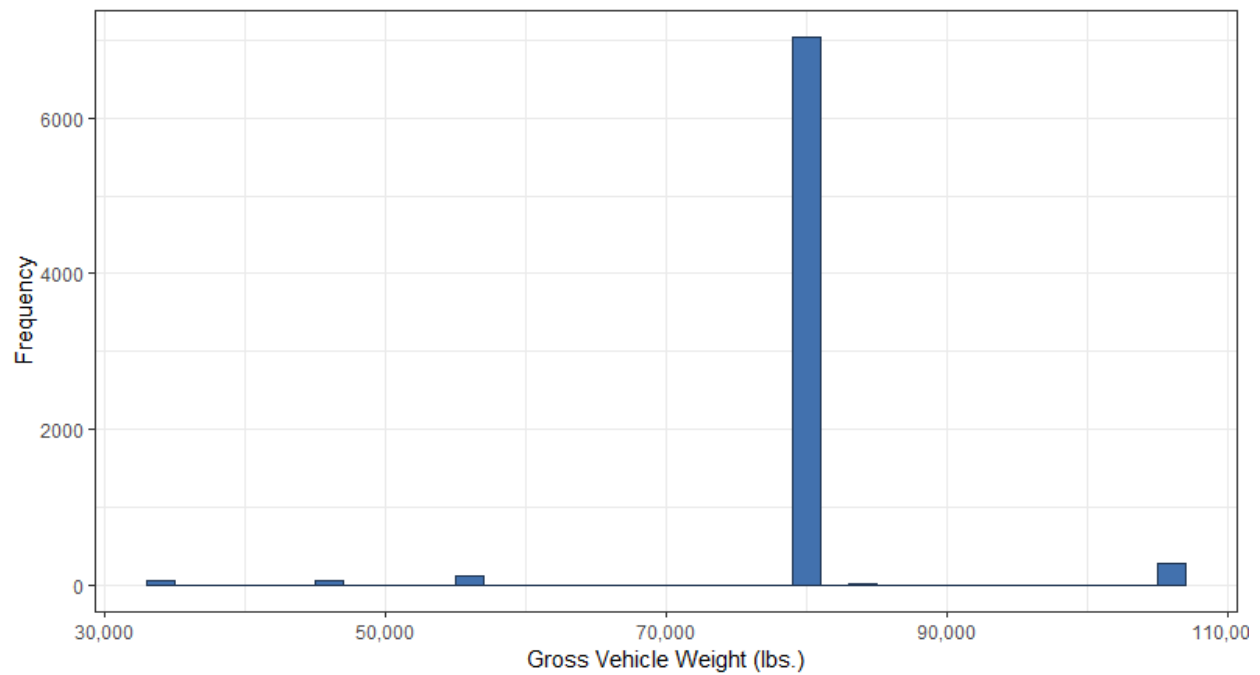


Figure 93. GVW Distribution of Food, Beverage, and Tobacco Product Manufacturing Shipments Originating in Idaho

Forestry and Logging

Figure 94 shows Forestry and Logging shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 95. In addition, GVW distribution of outbound shipments is observed in Figure 96.

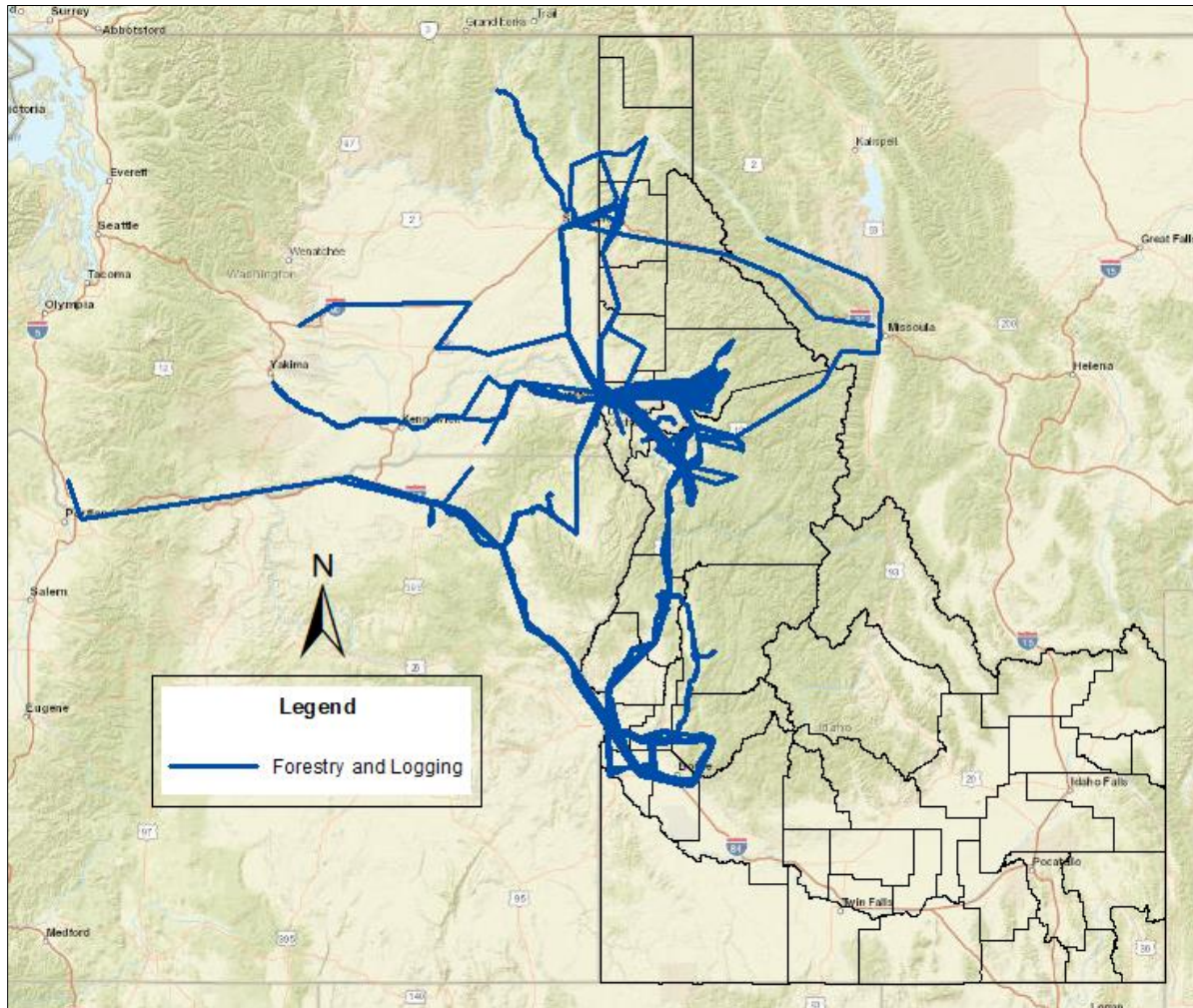


Figure 94. Forestry and Logging Shipments Originating in Idaho

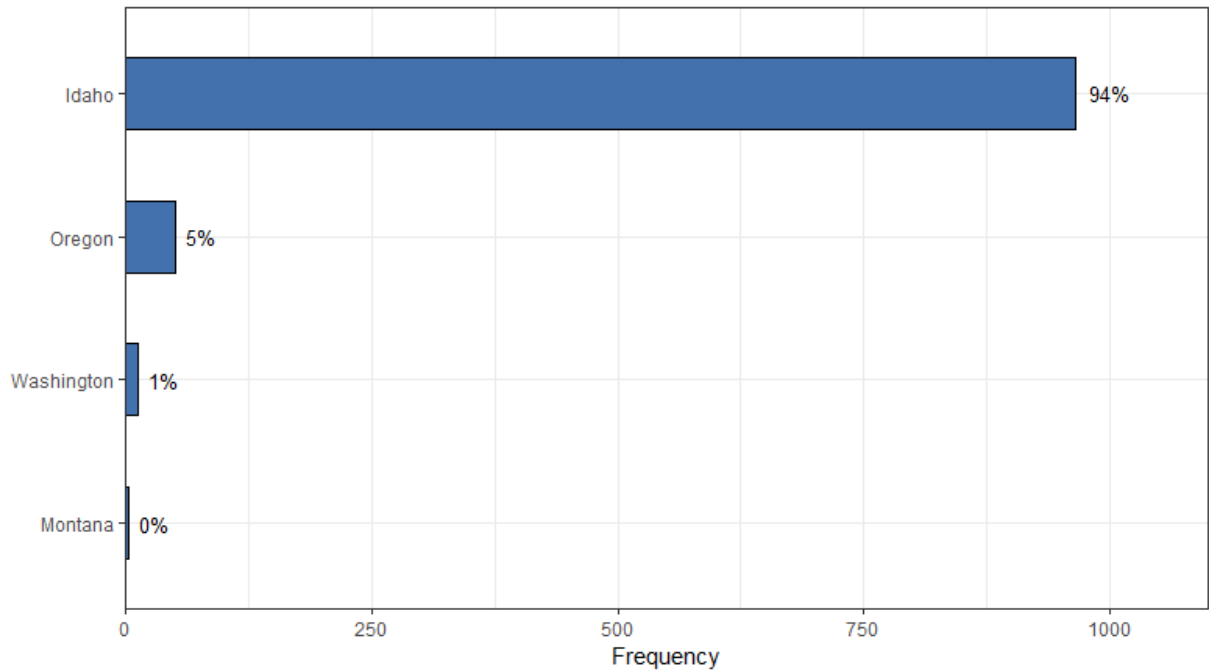


Figure 95. Destination States for Forestry and Logging Shipments Originating in Idaho

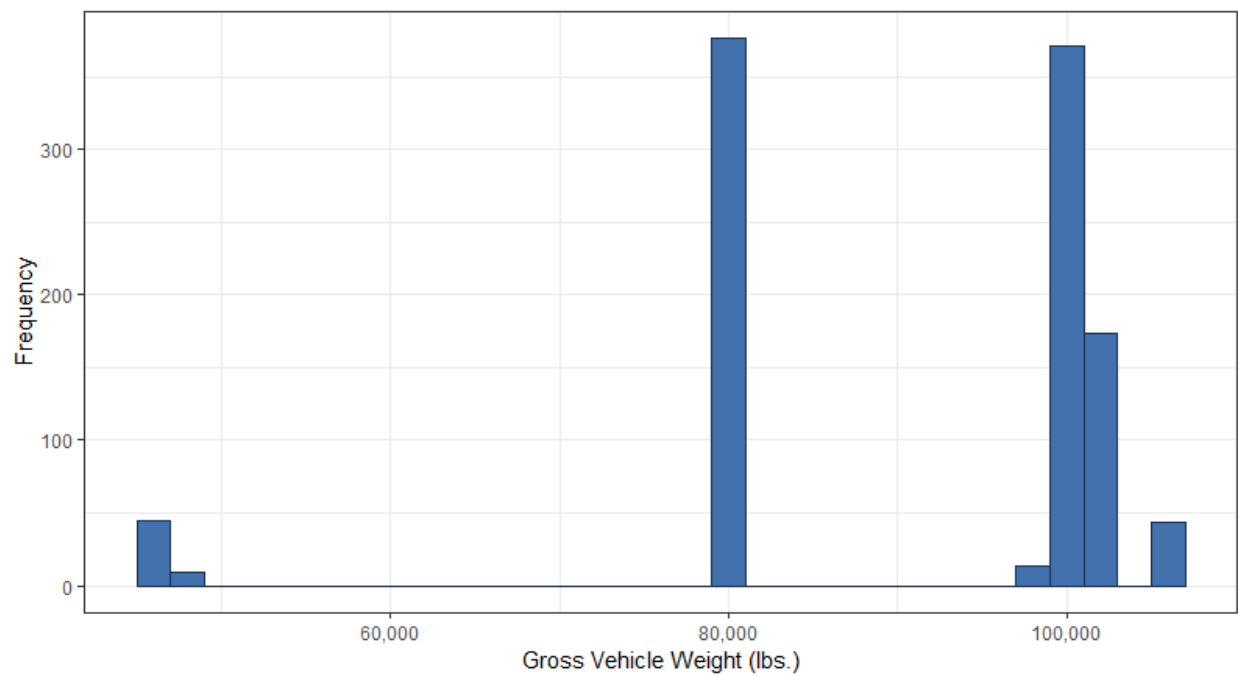


Figure 96. GVW Distribution of Forestry and Logging Shipments Originating in Idaho

General Freight

Figure 97 shows General Freight shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 98. In addition, GVW distribution of outbound shipments is observed in Figure 99.



Figure 97. General Freight Shipments Originating in Idaho

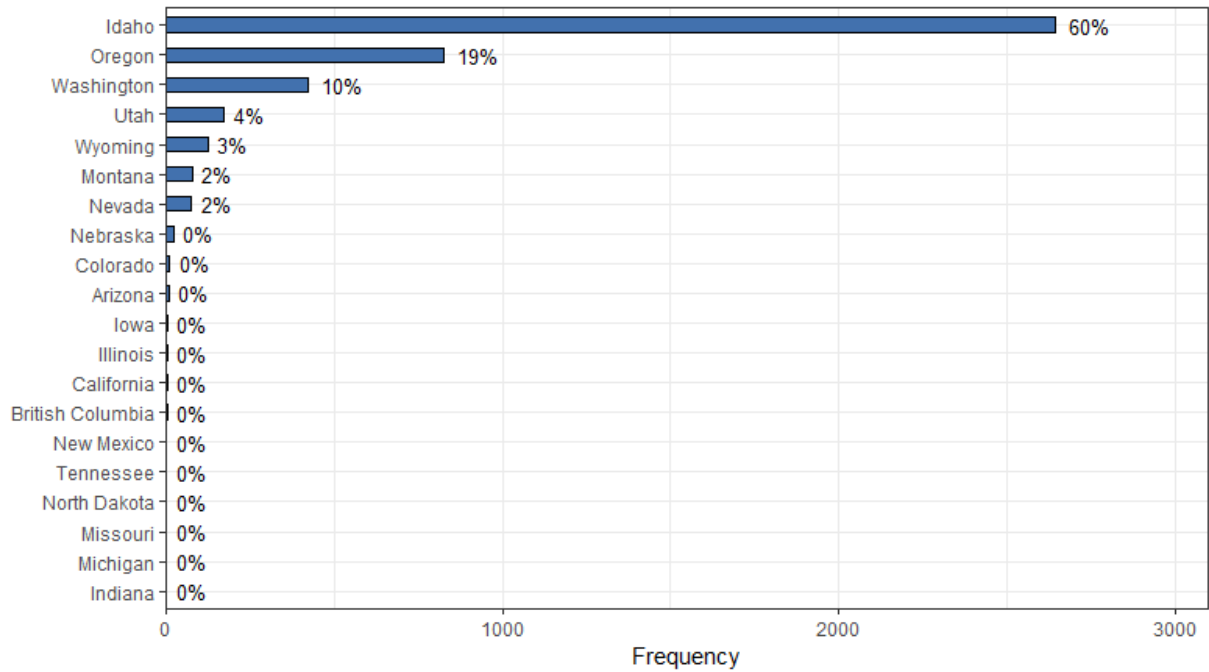


Figure 98. Destination States for General Freight Shipments Originating in Idaho

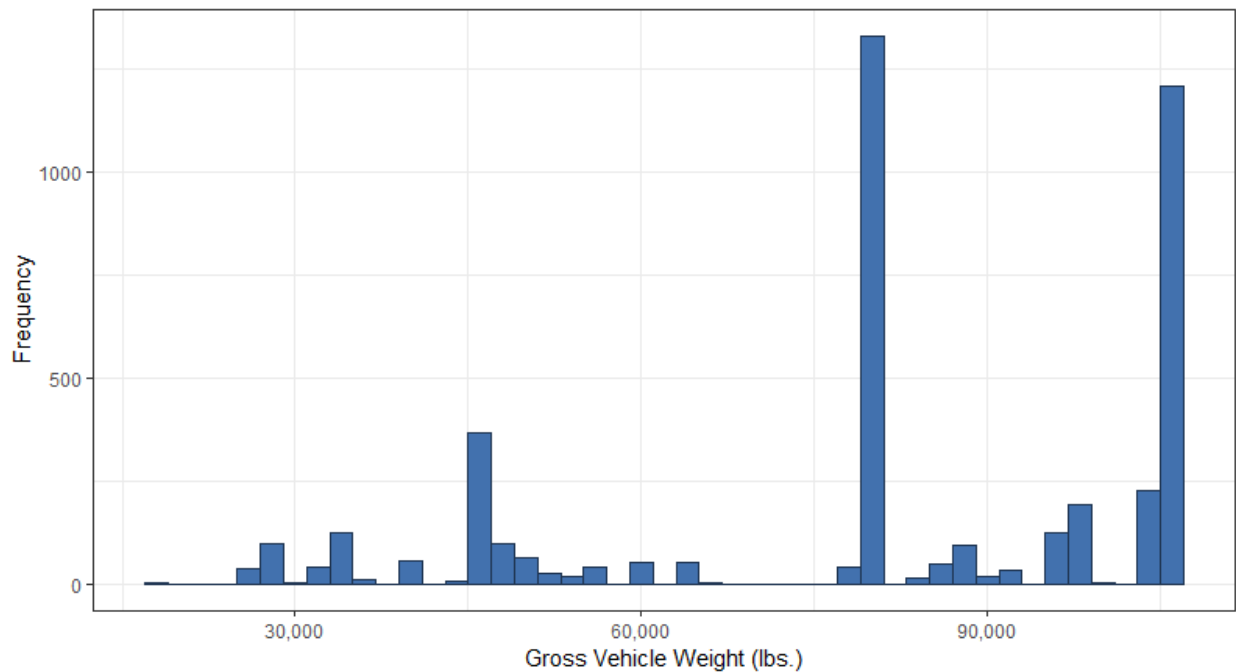


Figure 99. GVW Distribution of General Freight Shipments Originating in Idaho

General Haulage

Figure 100 shows General Haulage shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 101. In addition, GVW distribution of outbound shipments is observed in Figure 102.

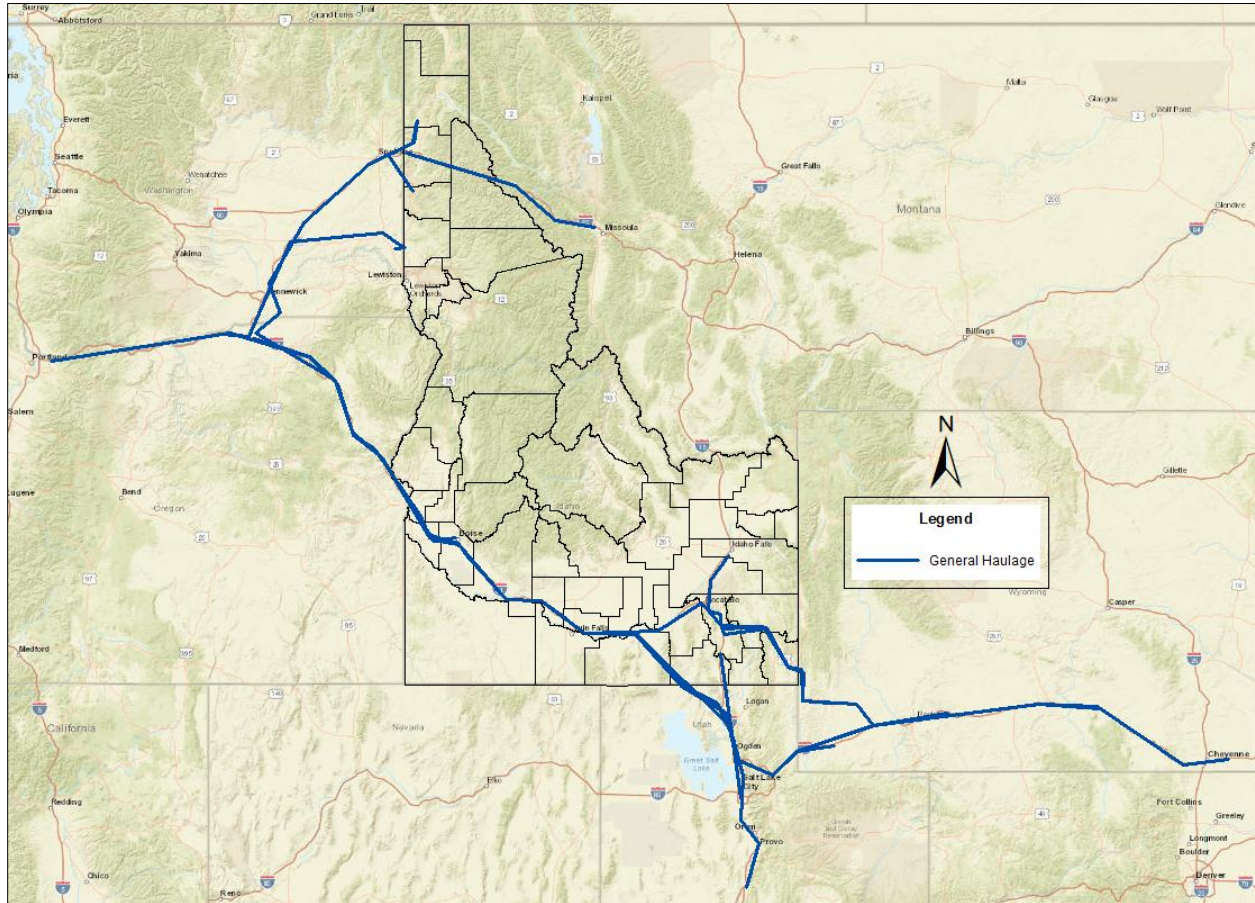


Figure 100. General Haulage Shipments Originating in Idaho

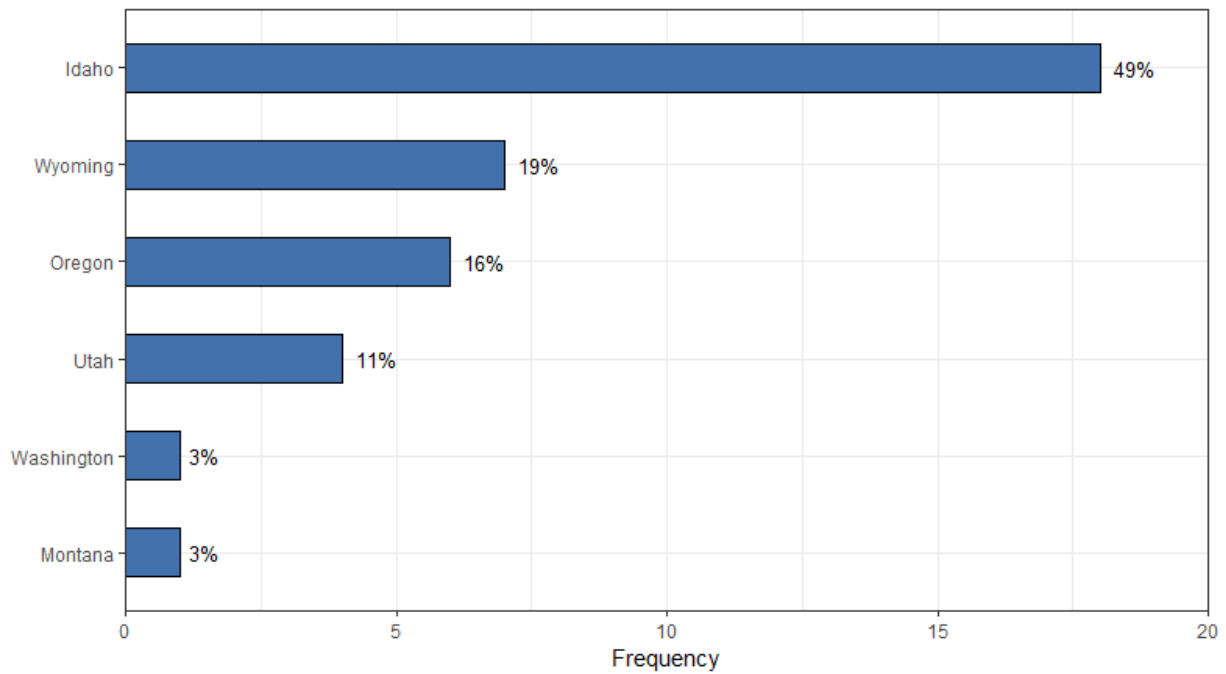


Figure 101. Destination States for General Haulage Shipments Originating in Idaho

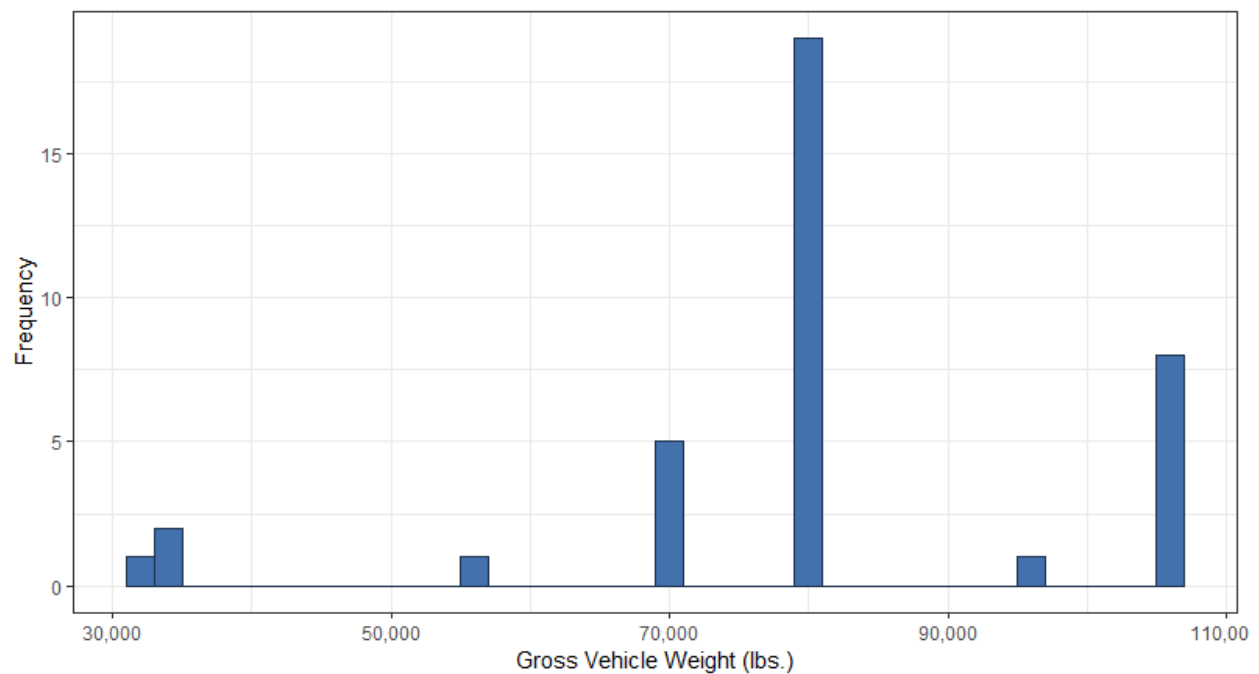


Figure 102. GVW Distribution of General Haulage Shipments Originating in Idaho

Horticulture

Figure 103 shows Horticulture shipments that are originating in Idaho. Just one record of this type of shipment was present in the EROAD data. This shipment was destined to Oregon and had a recorded GVW of 54,000 pounds.

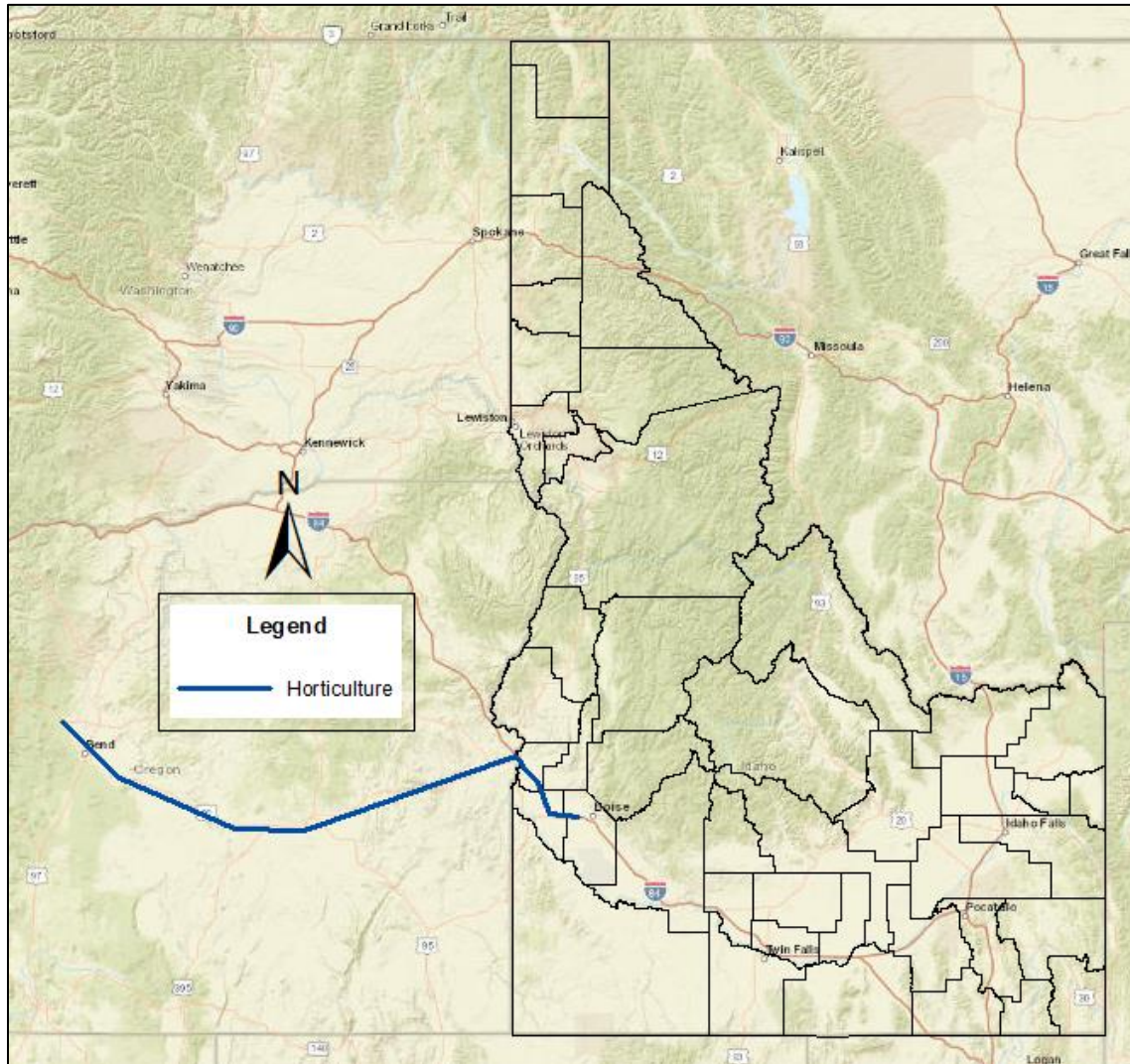


Figure 103. Horticulture Shipments Originating in Idaho

Mining

Figure 104 shows Mining shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 105. In addition, GVW distribution of outbound shipments is observed in Figure 106.

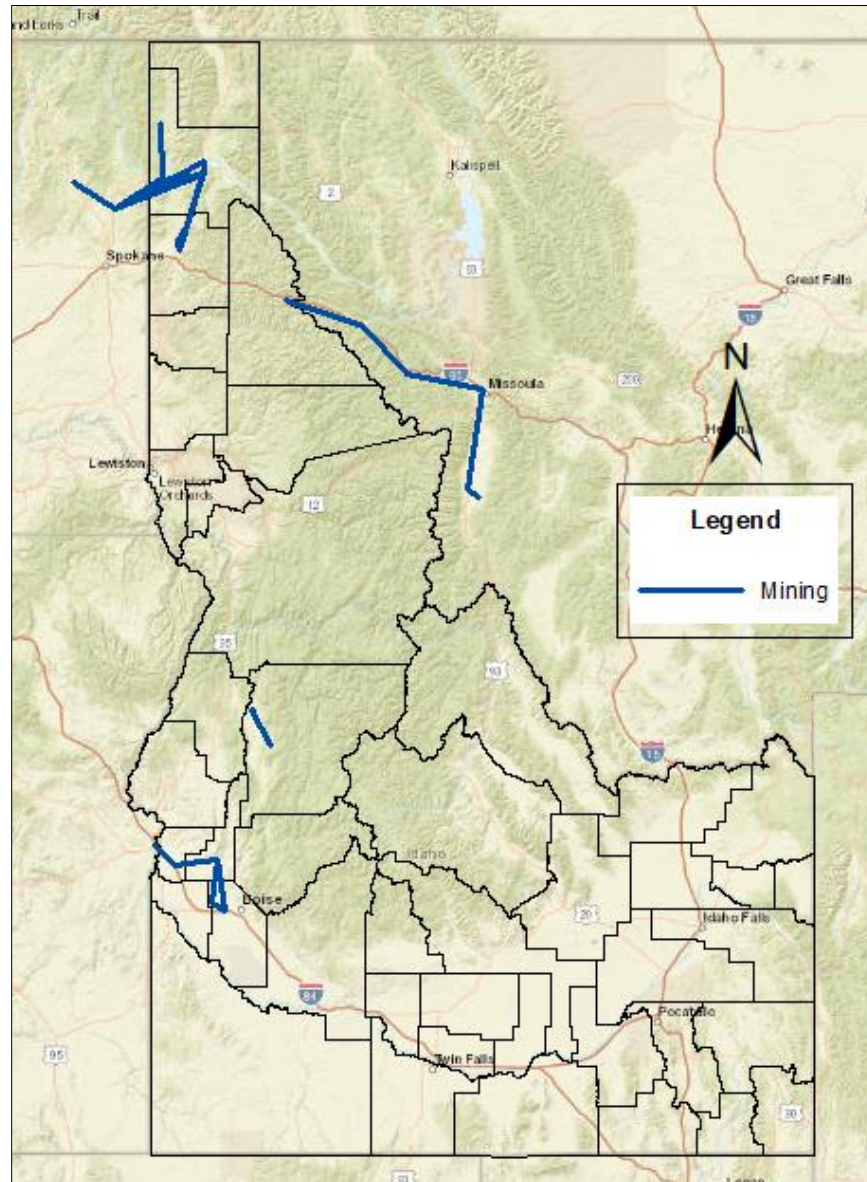


Figure 104. Mining Shipments Originating in Idaho

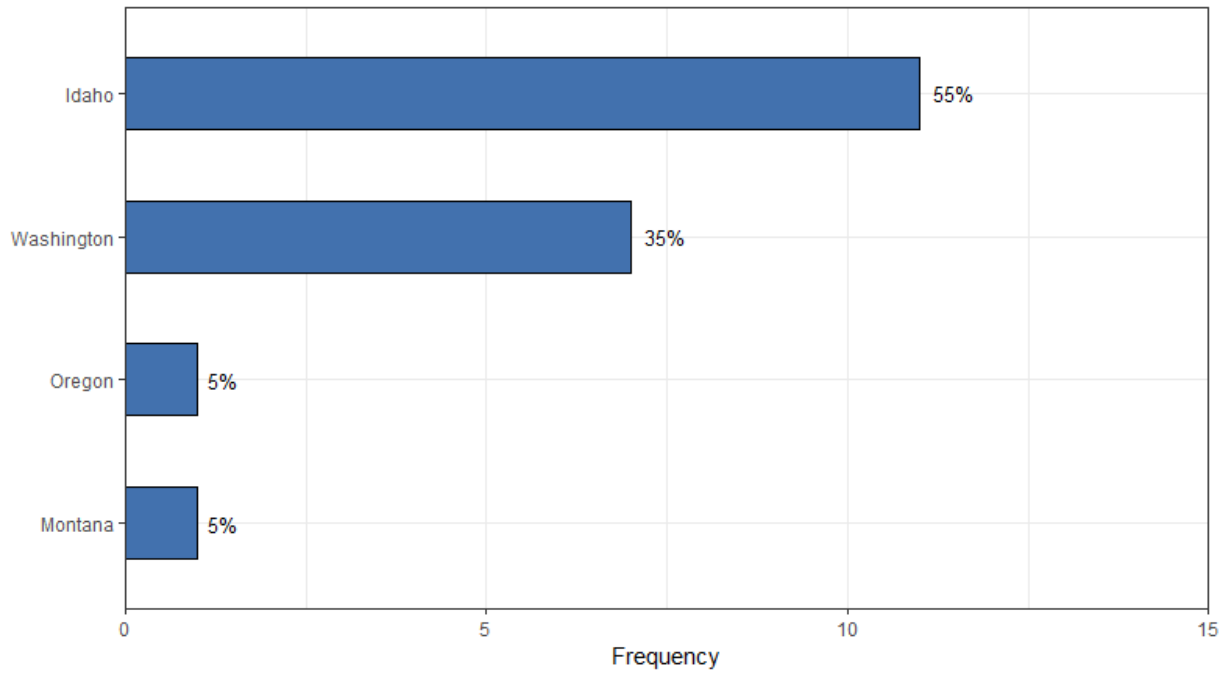


Figure 105. Destination States for Mining Shipments Originating in Idaho

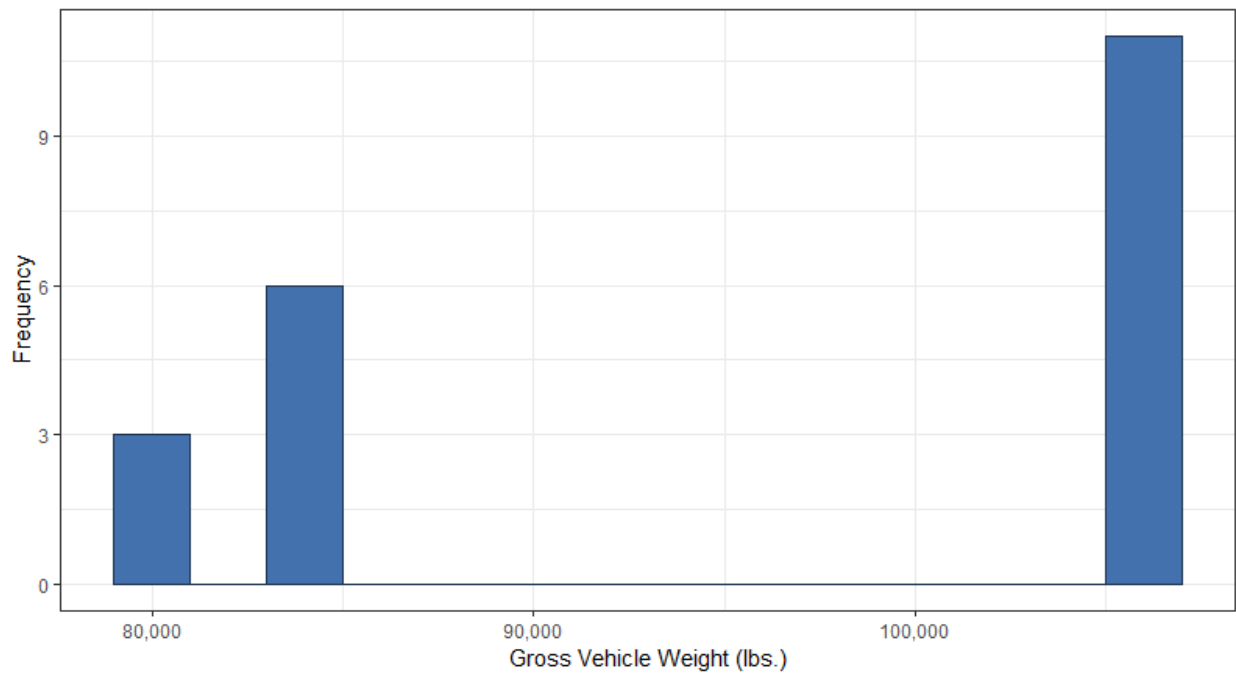


Figure 106. GVW Distribution of Mining Shipments Originating in Idaho

Other Agriculture

Figure 107 shows Other Agriculture shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 108. In addition, GVW distribution of outbound shipments is observed in Figure 109.



Figure 107. Other Agriculture Shipments Originating in Idaho

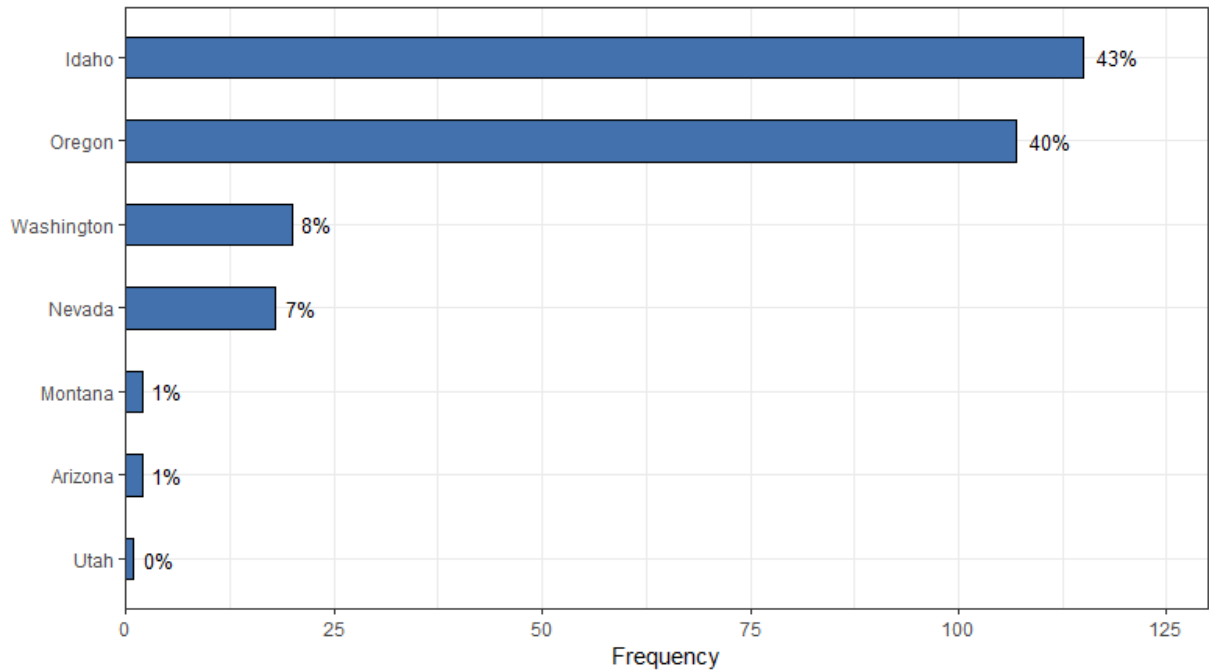


Figure 108. Destination States for Other Agriculture Shipments Originating in Idaho

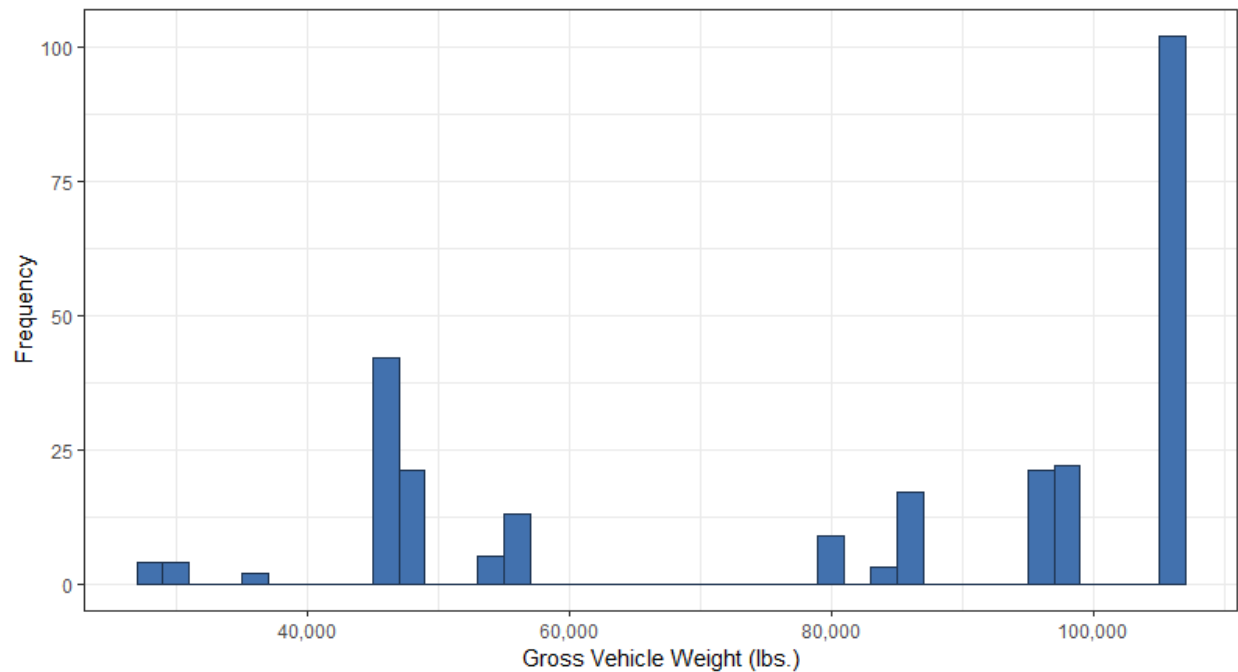


Figure 109. GVW Distribution of Other Agriculture Shipments Originating in Idaho

Other Services

Figure 110 shows Other Services shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 111. In addition, GVW distribution of outbound shipments is observed in Figure 112 .

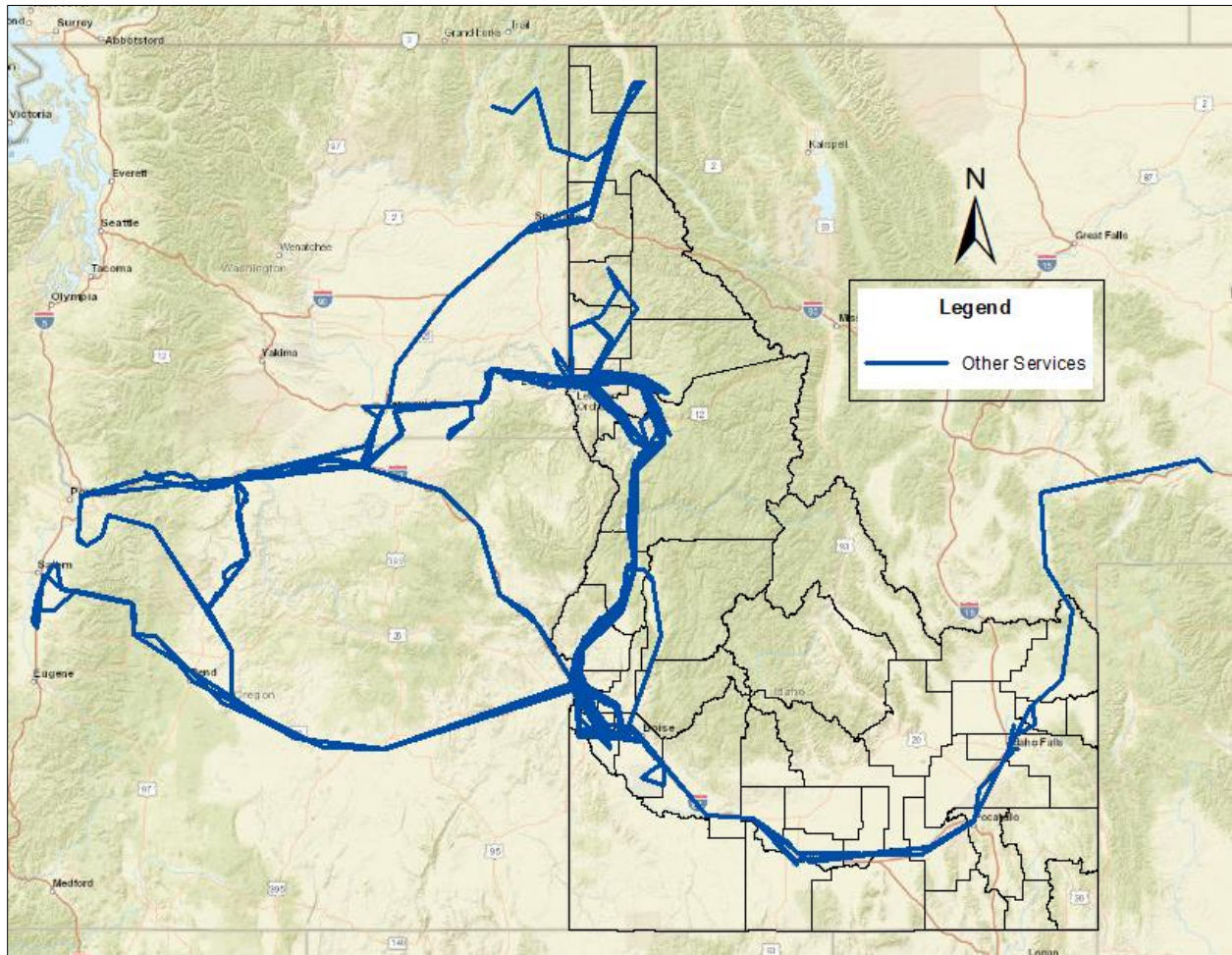


Figure 110. Other Services Shipments Originating in Idaho

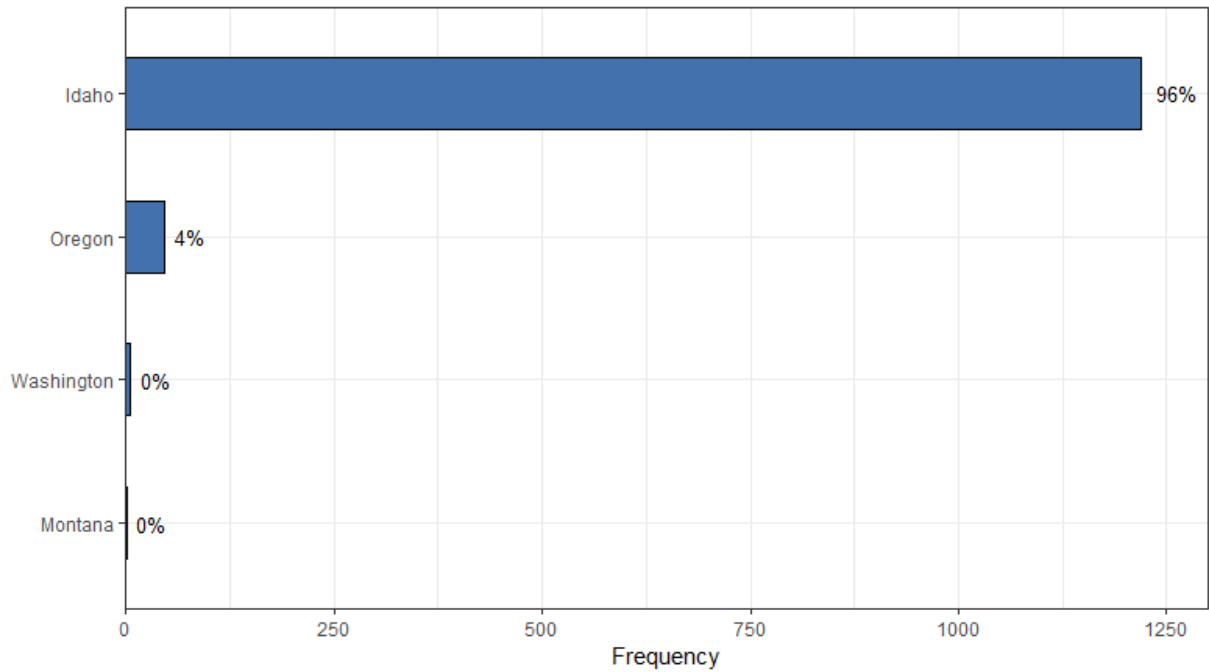


Figure 111. Destination States for Other Services Shipments Originating in Idaho

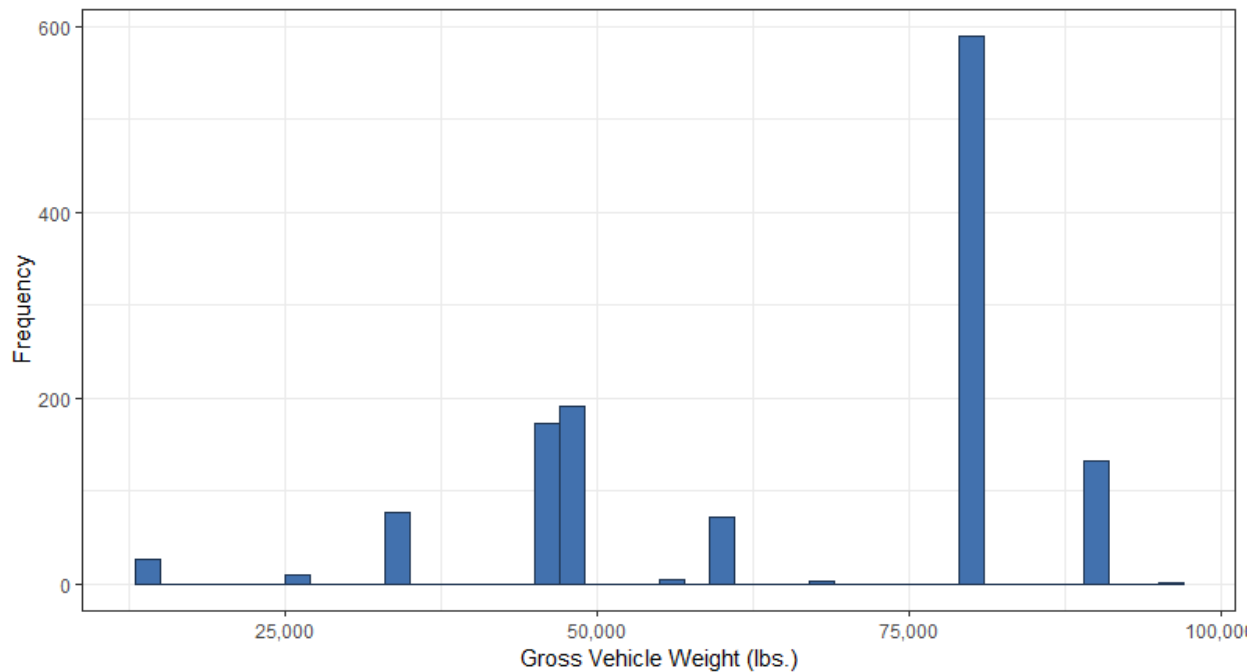


Figure 112. GVW Distribution of Other Services Shipments Originating in Idaho

Owner-Occupied Property Operation (National Accounts Only)

Figure 113 shows Owner-Occupied Property Operation (National Accounts Only) shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 114. Based on EROAD records, each of the shipments had a recorded GVW of 90,000 pounds.

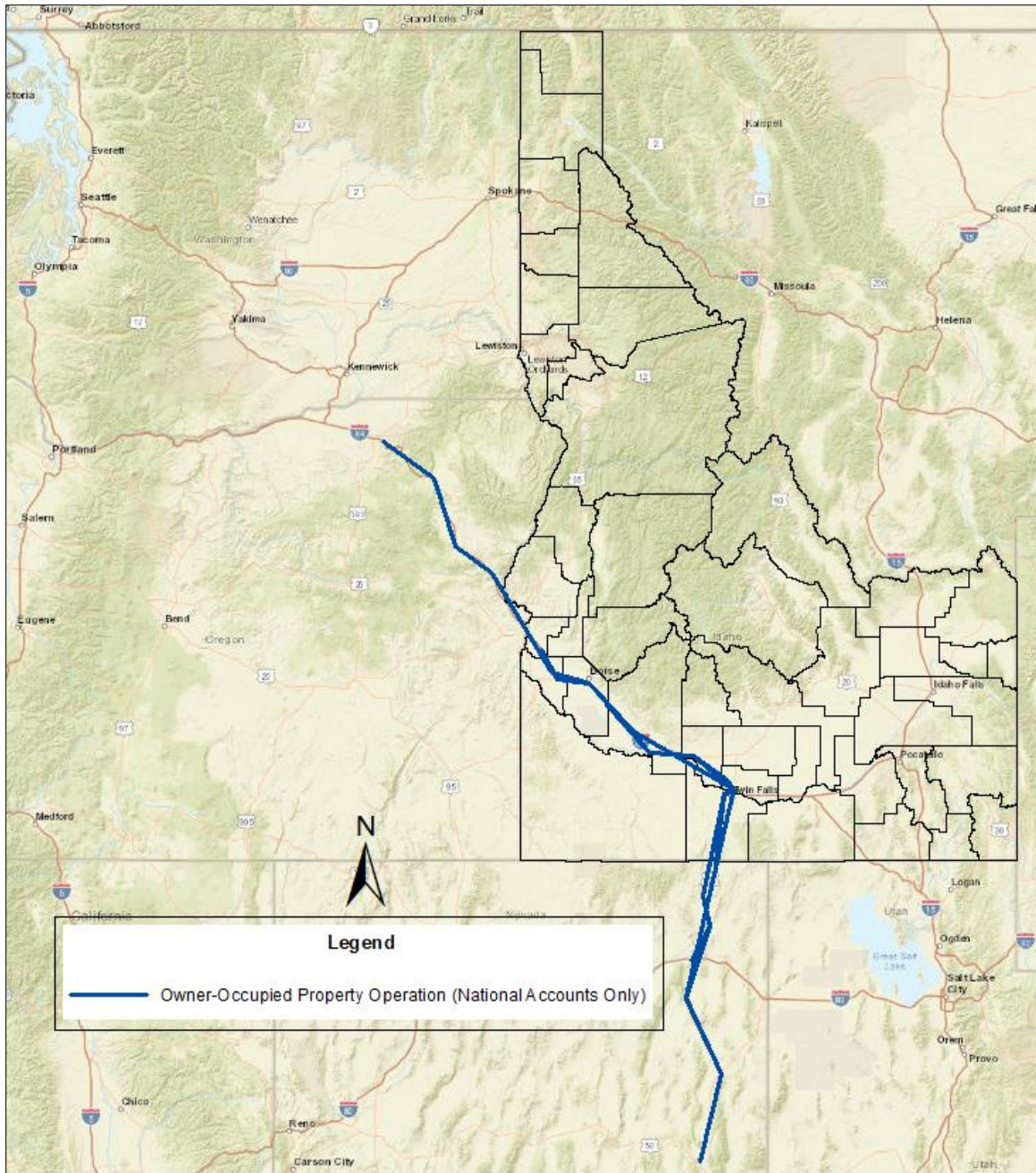


Figure 113. Owner-Occupied Property Operation (National Accounts Only) Shipments Originating in Idaho

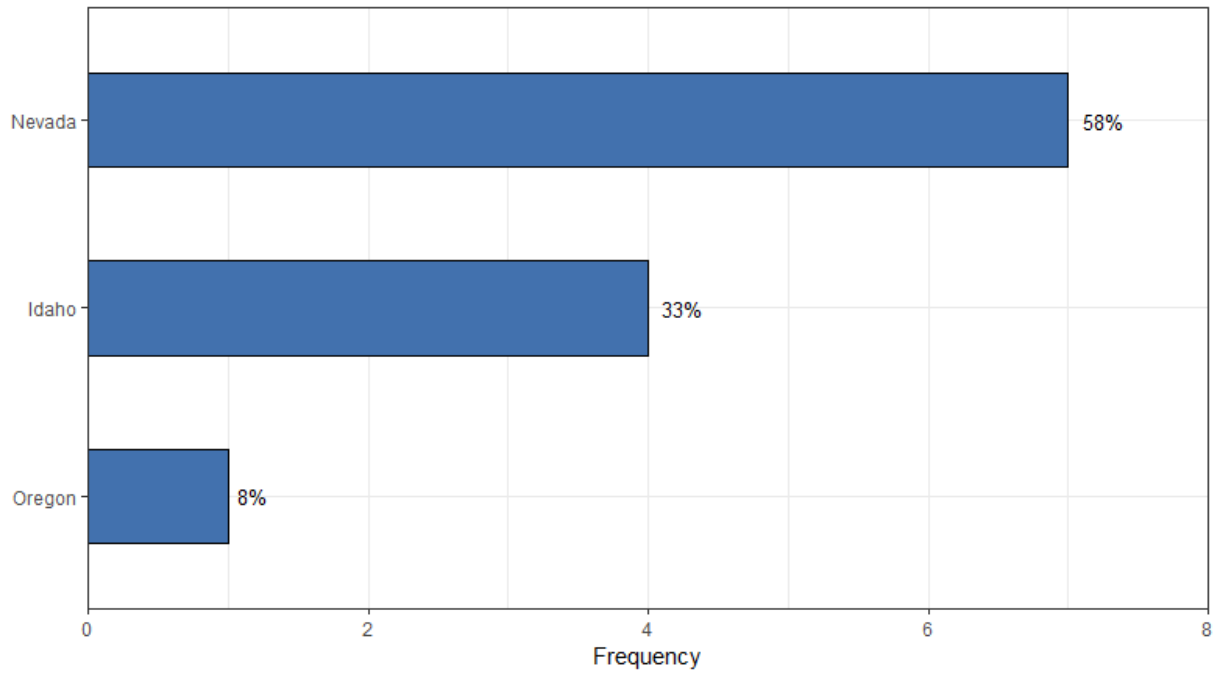


Figure 114. Destination States for Owner-Occupied Property Operation (National Accounts Only) Shipments Originating in Idaho

Private Transport

Figure 115 shows Private Transport shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 116. In addition, GVW distribution of outbound shipments is observed in Figure 117.



Figure 115. Private Transport Shipment Originating in Idaho

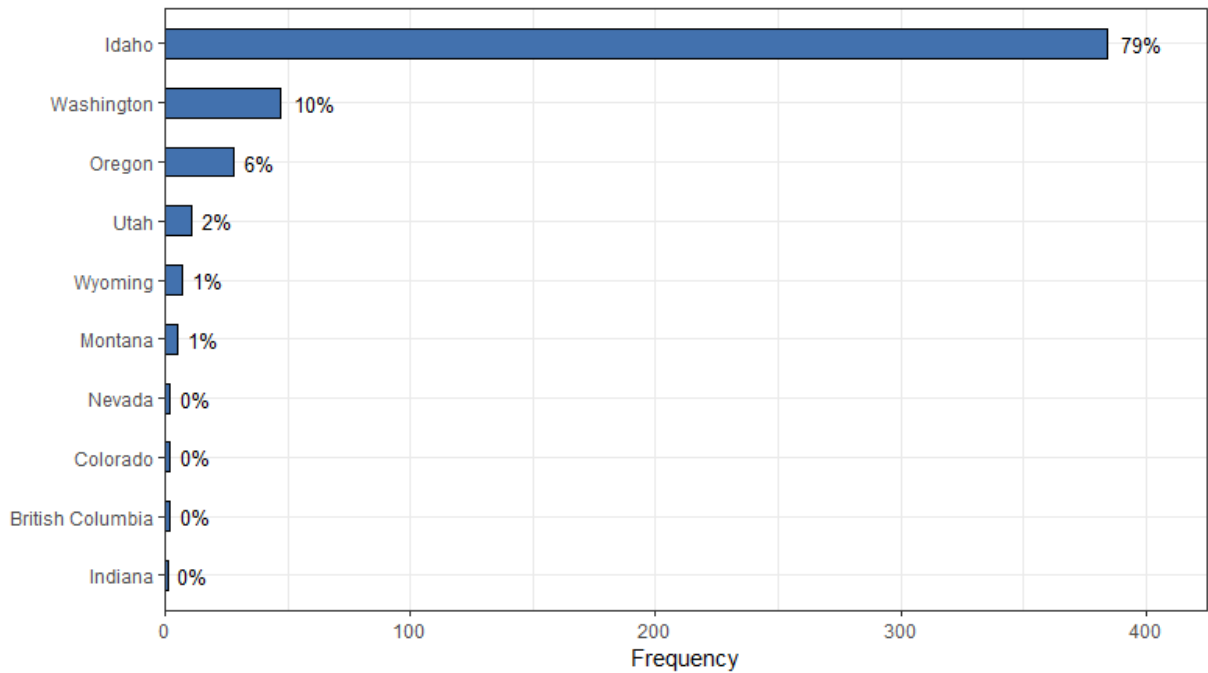


Figure 116. Destination States for Private Transport Shipment Originating in Idaho

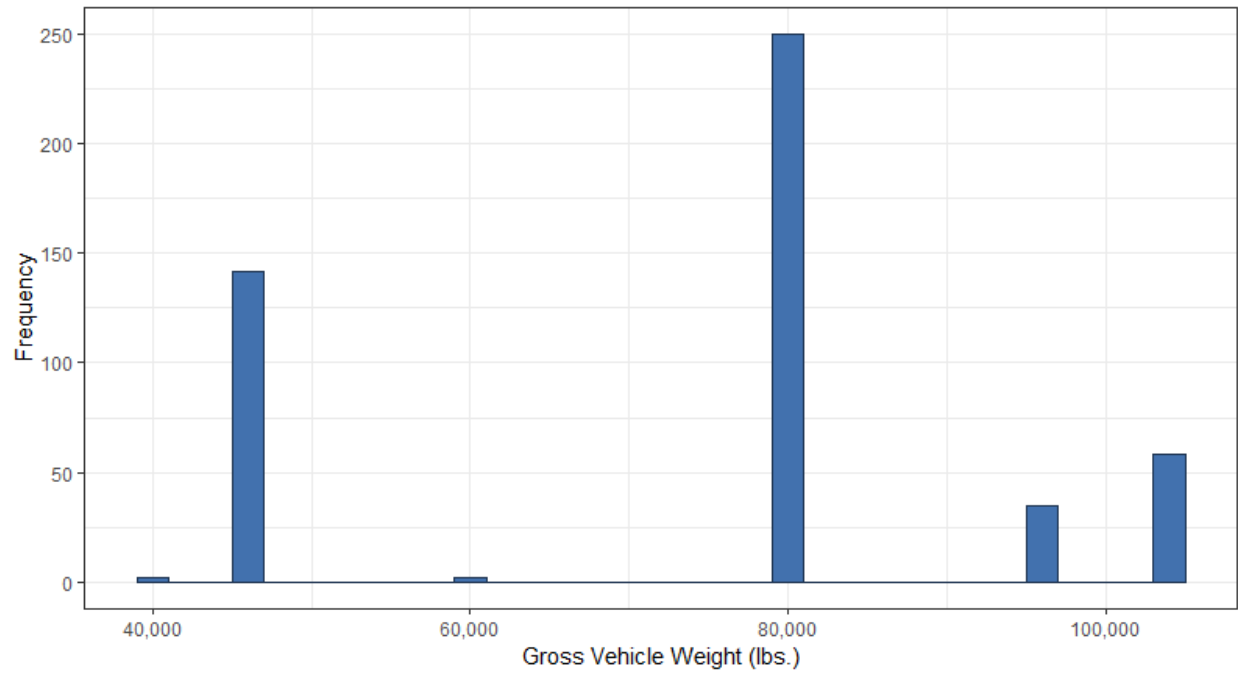


Figure 117. GVW Distribution of Private Transport Shipment Originating in Idaho

Refrigerated Haulage

Figure 118 shows Refrigerated Haulage shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 119. In addition, GVW distribution of outbound shipments is observed in Figure 120.



Figure 118. Refrigerated Haulage Shipments Originating in Idaho

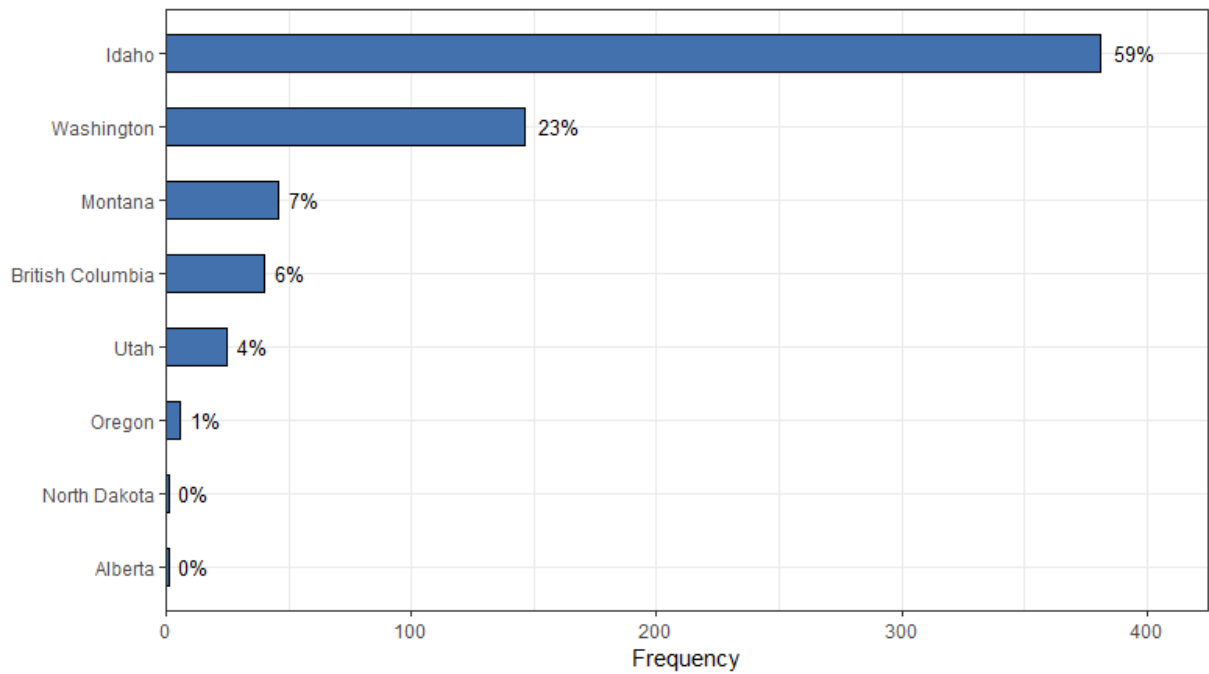


Figure 119. Destination States for Refrigerated Haulage Shipments Originating in Idaho

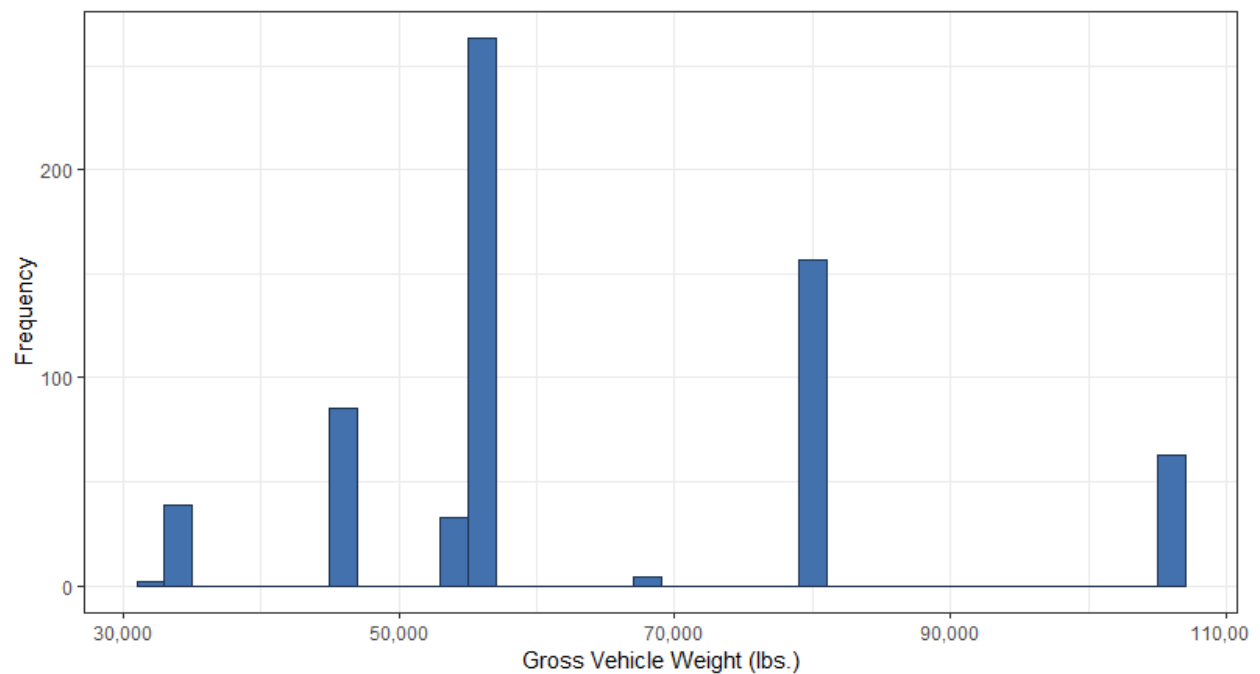


Figure 120. GVW Distribution of Refrigerated Haulage Shipments Originating in Idaho

Rental, Hiring, and Real Estate Services

Figure 121 shows Rental, Hiring, and Real Estate Services shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 122. In addition, GVW distribution of outbound shipments is observed in Figure 123.

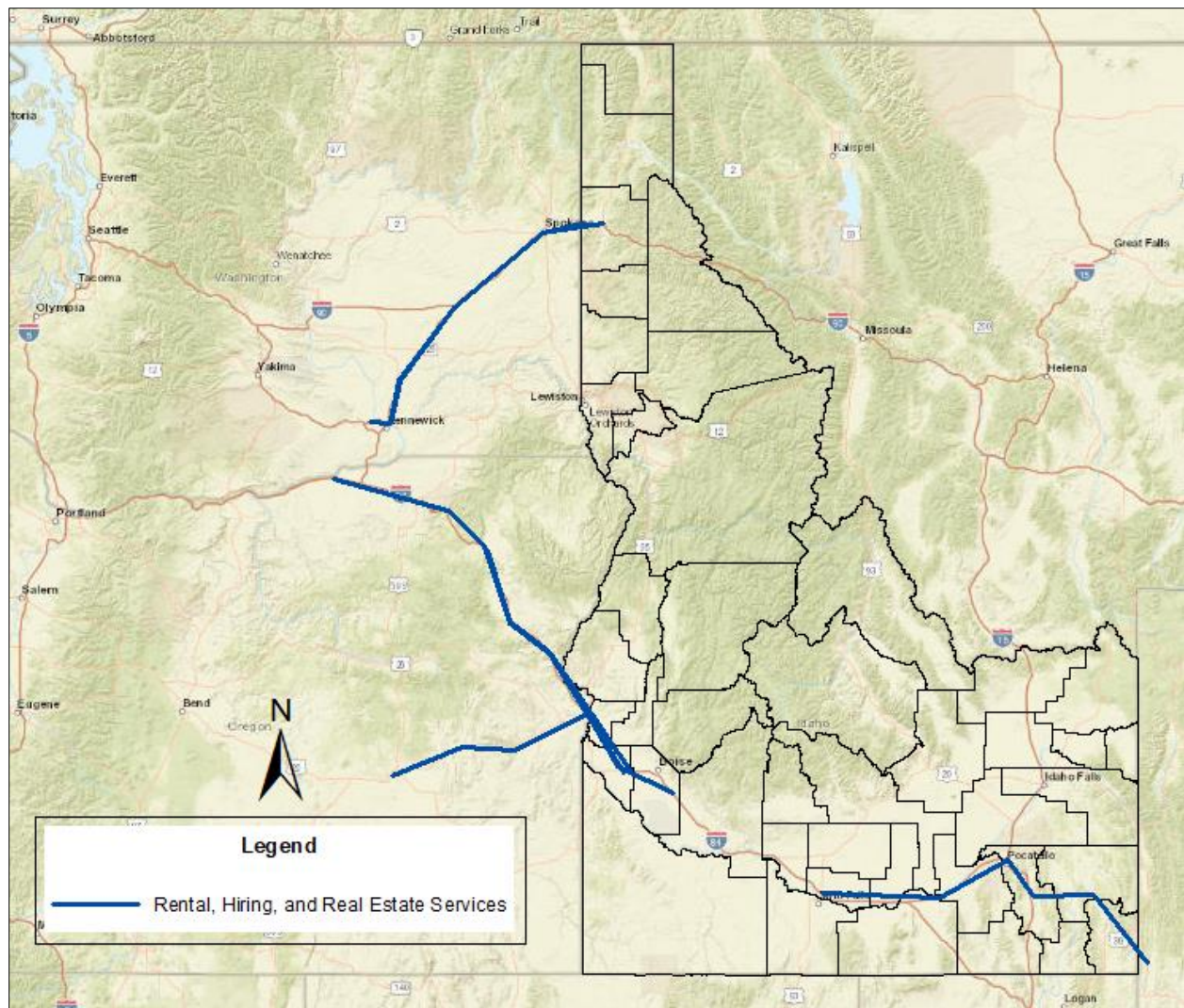


Figure 121. Rental, Hiring, and Real Estate Services Shipments Originating in Idaho

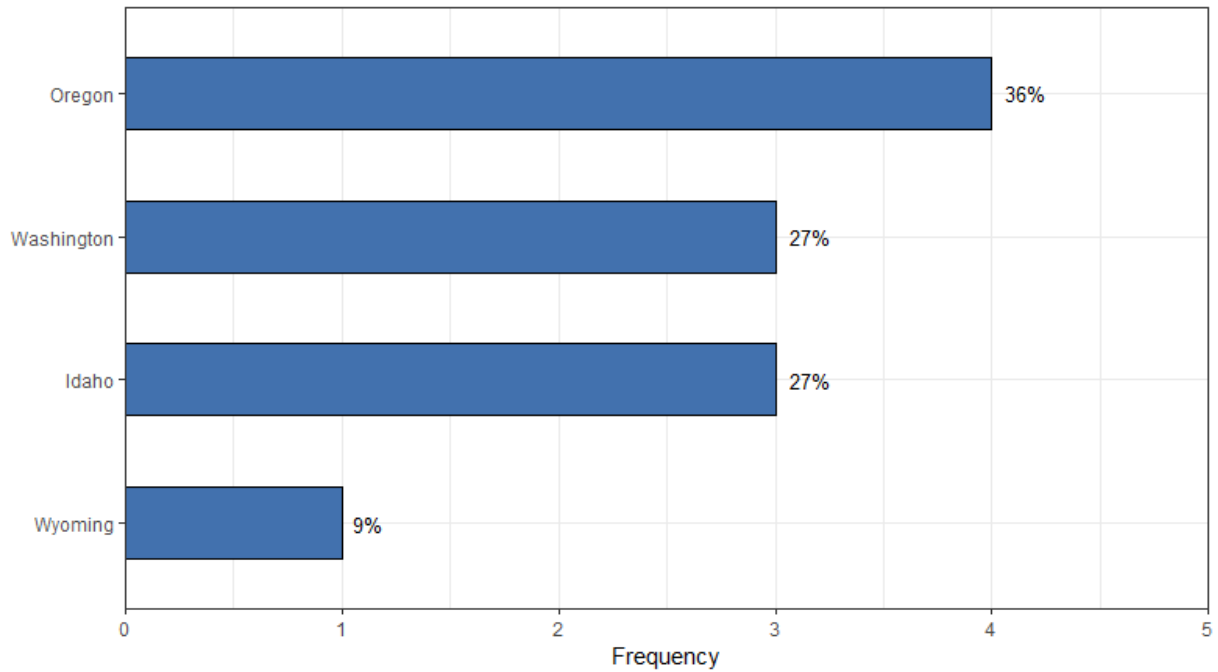


Figure 122. Destination States for Rental, Hiring, and Real Estate Services Shipments Originating in Idaho

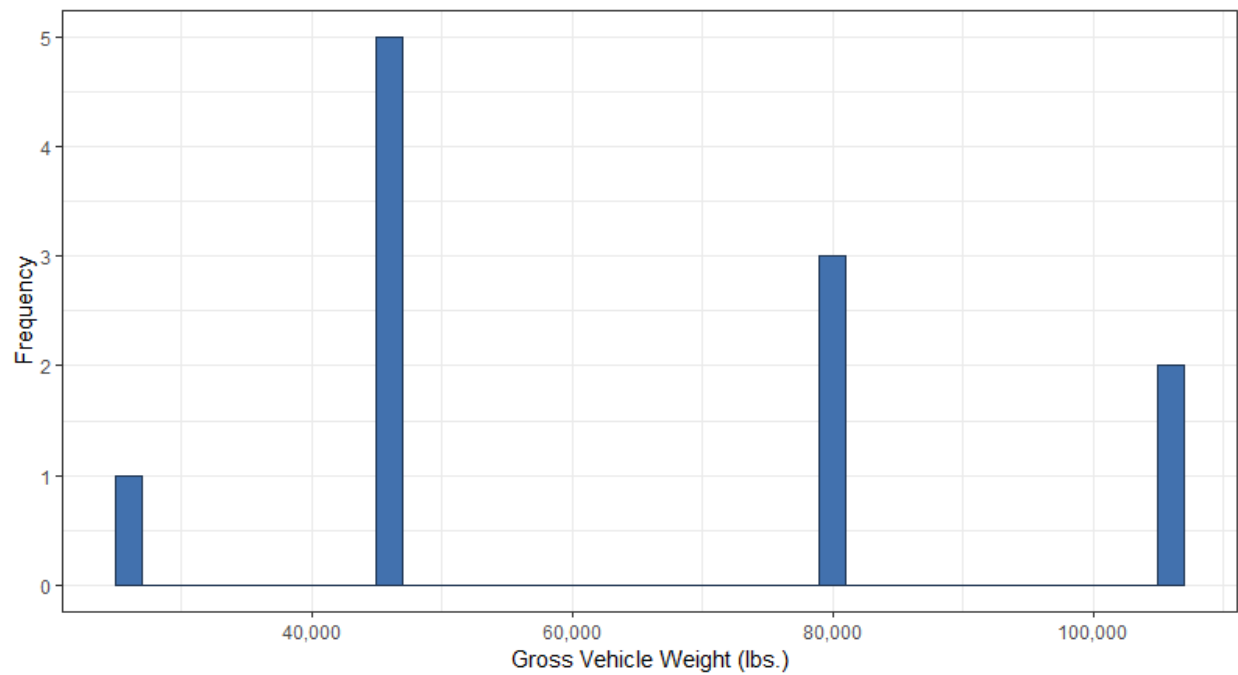


Figure 123. GVW Distribution of Rental, Hiring, and Real Estate Services Shipments Originating in Idaho

Retail Trade

Figure 124 shows Retail Trade shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 125. In addition, GVW distribution of outbound shipments is observed in Figure 126.

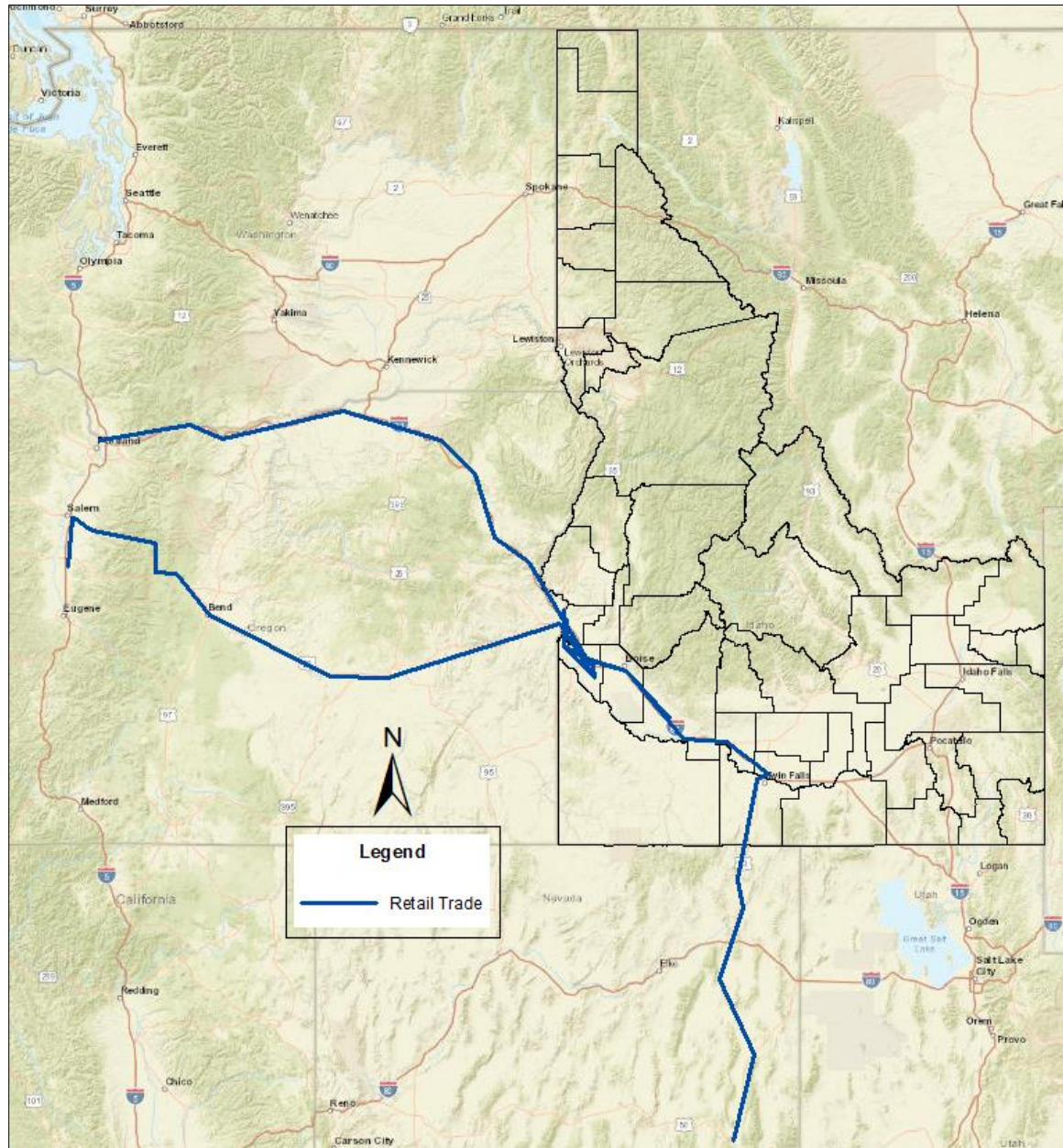


Figure 124. Retail Trade Shipments Originating in Idaho

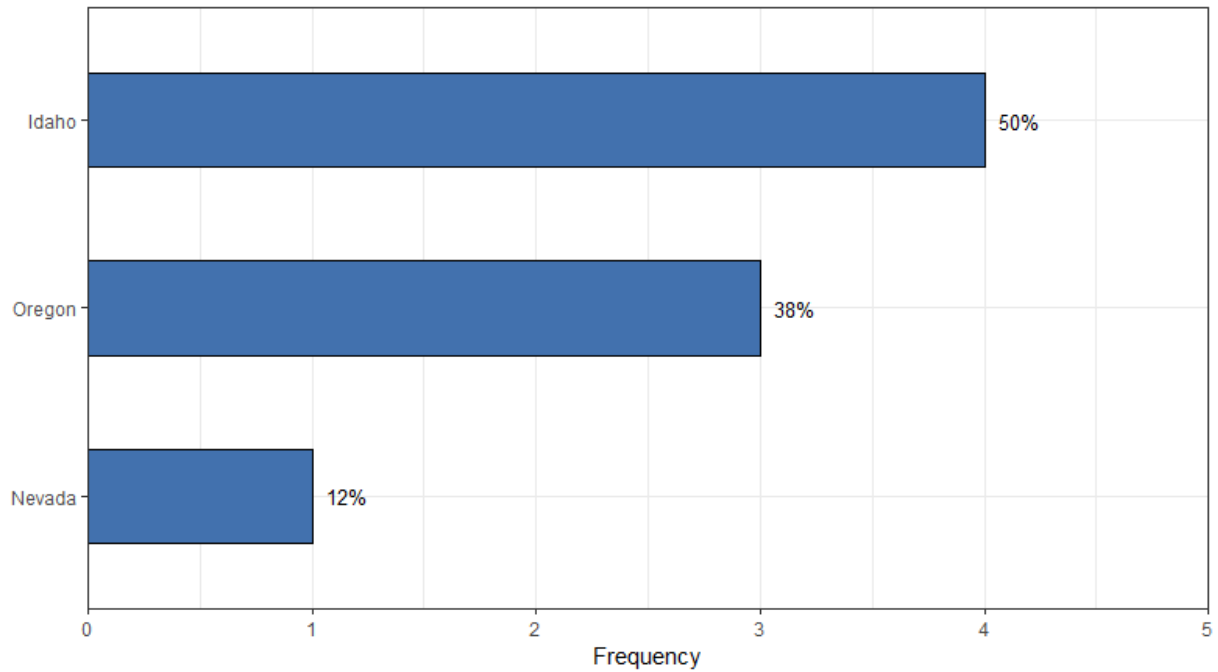


Figure 125. Destination States for Retail Trade Shipments Originating in Idaho

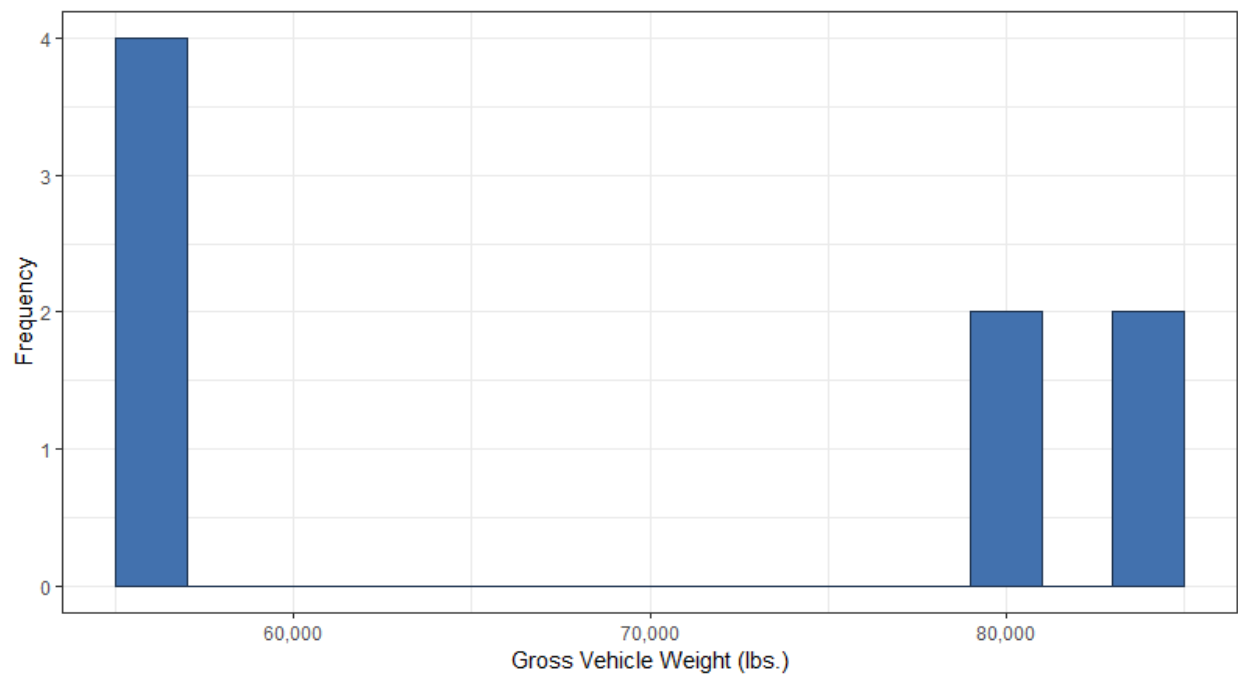


Figure 126. GVW Distribution of Retail Trade Shipments Originating in Idaho

Steel and Aluminum

Figure 127 shows Steel and Aluminum shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 128. In addition, GVW distribution of outbound shipments is observed in Figure 129.



Figure 127. Steel and Aluminum Shipments Originating in Idaho

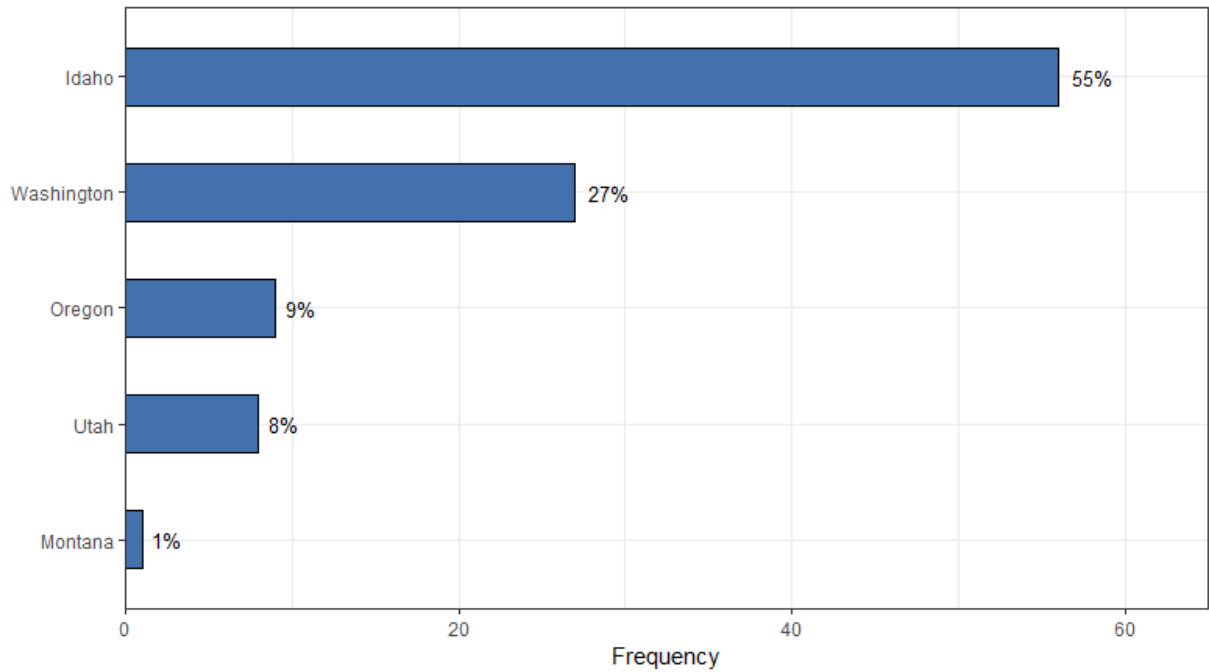


Figure 128. Destination States for Steel and Aluminum Shipments Originating in Idaho

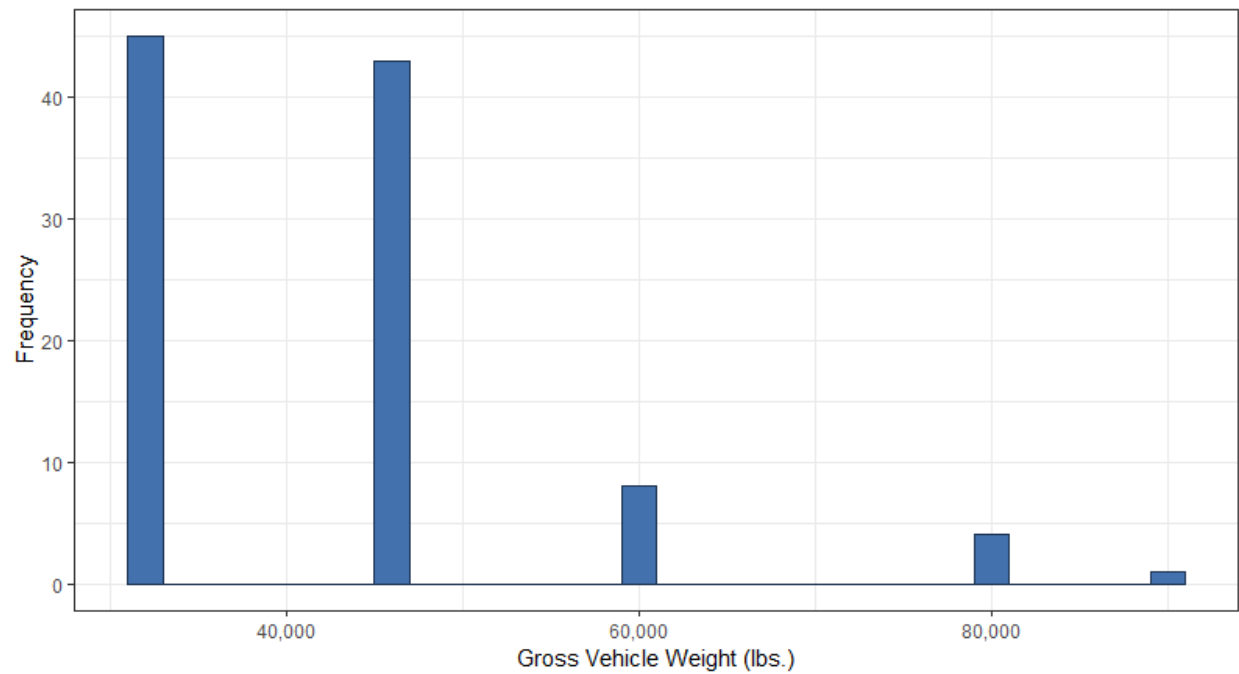


Figure 129. GVW Distribution of Steel and Aluminum Shipments Originating in Idaho

Transport Equipment, Machinery and Equipment Manufacturing

Figure 130 shows Transport Equipment, Machinery and Equipment Manufacturing shipments that are originating in Idaho. According to EROAD records, the proportion of shipments by which state they are destined to is summarized in Figure 131. In addition, GVW distribution of outbound shipments is observed in Figure 132.

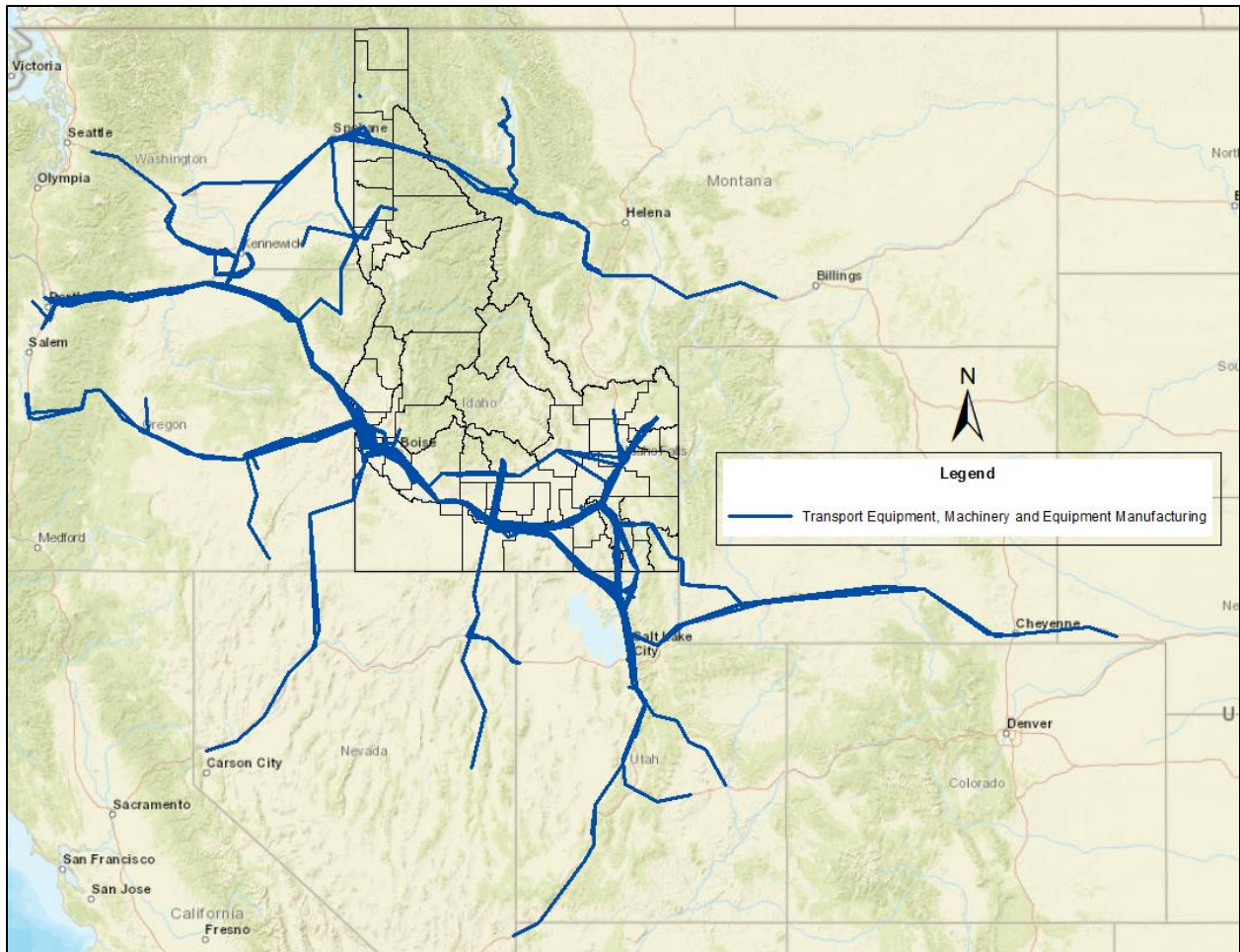


Figure 130. Transport Equipment, Machinery and Equipment Manufacturing Shipments Originating in Idaho

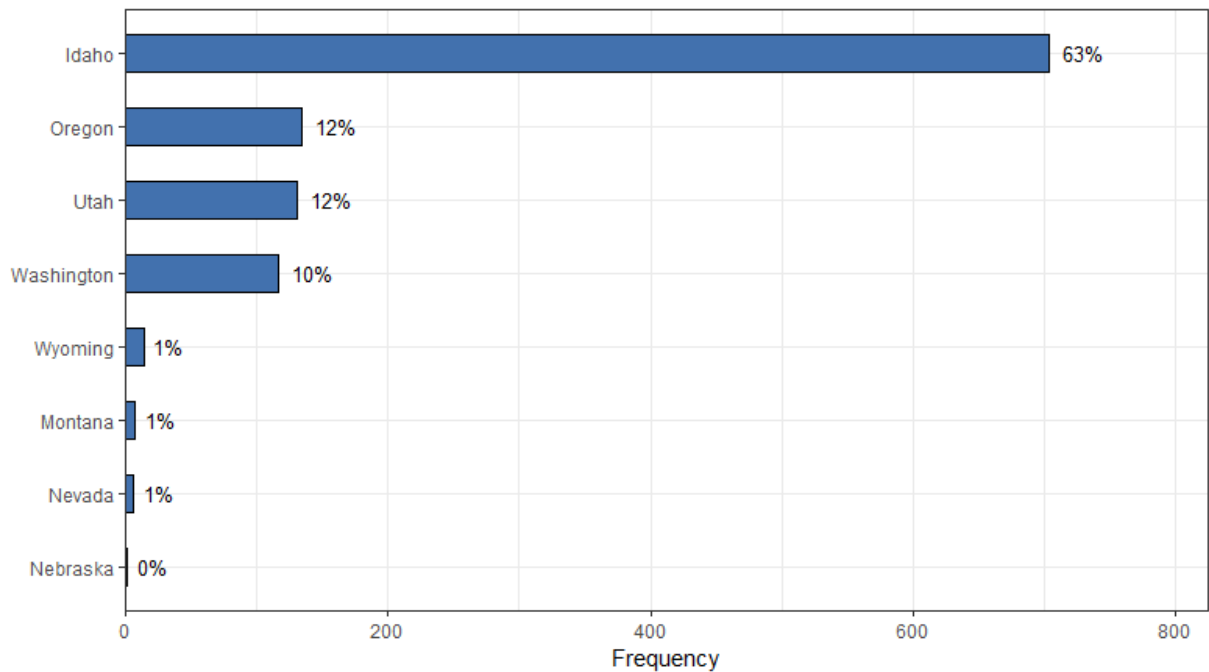


Figure 131. Destination States for Transport Equipment, Machinery and Equipment Manufacturing Shipments Originating in Idaho

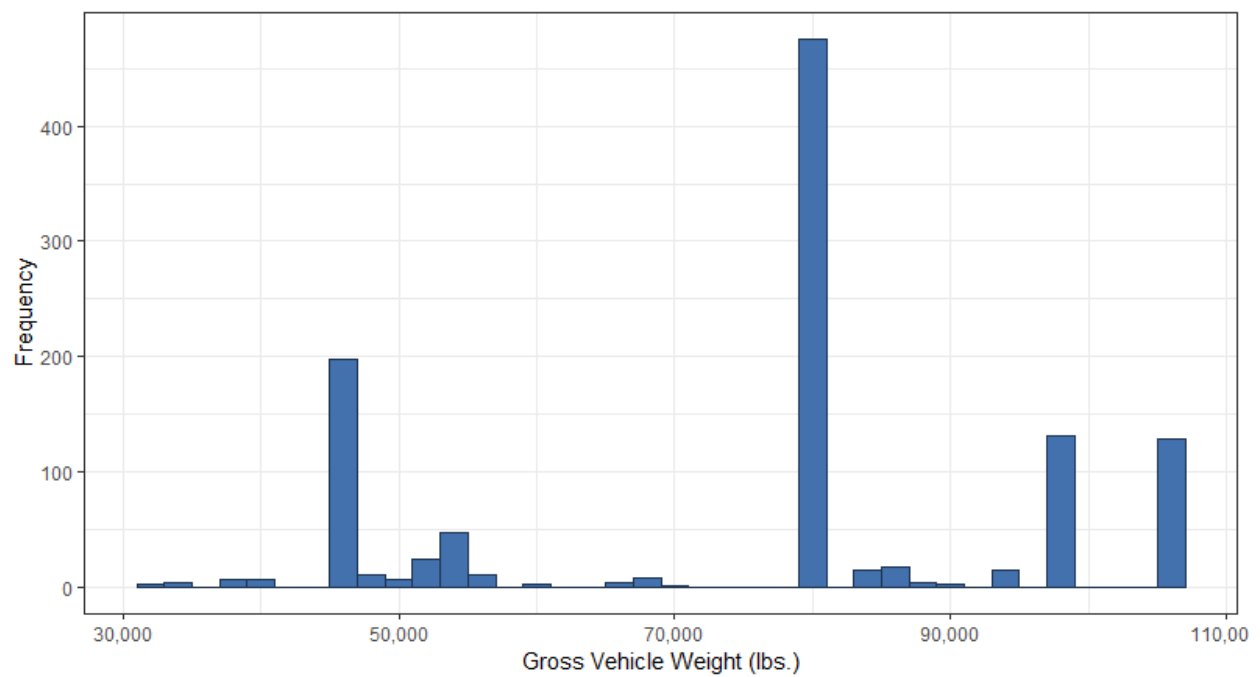


Figure 132. GVW Distribution of Transport Equipment, Machinery and Equipment Manufacturing Shipments Originating in Idaho

Transport, Postal and Warehousing

Figure 133 shows Transport, Postal and Warehousing shipments that are originating in Idaho. According to EROAD records, one such shipment was recorded. This shipment was destined to Oregon and had a recorded GVW of 42,000 pounds.

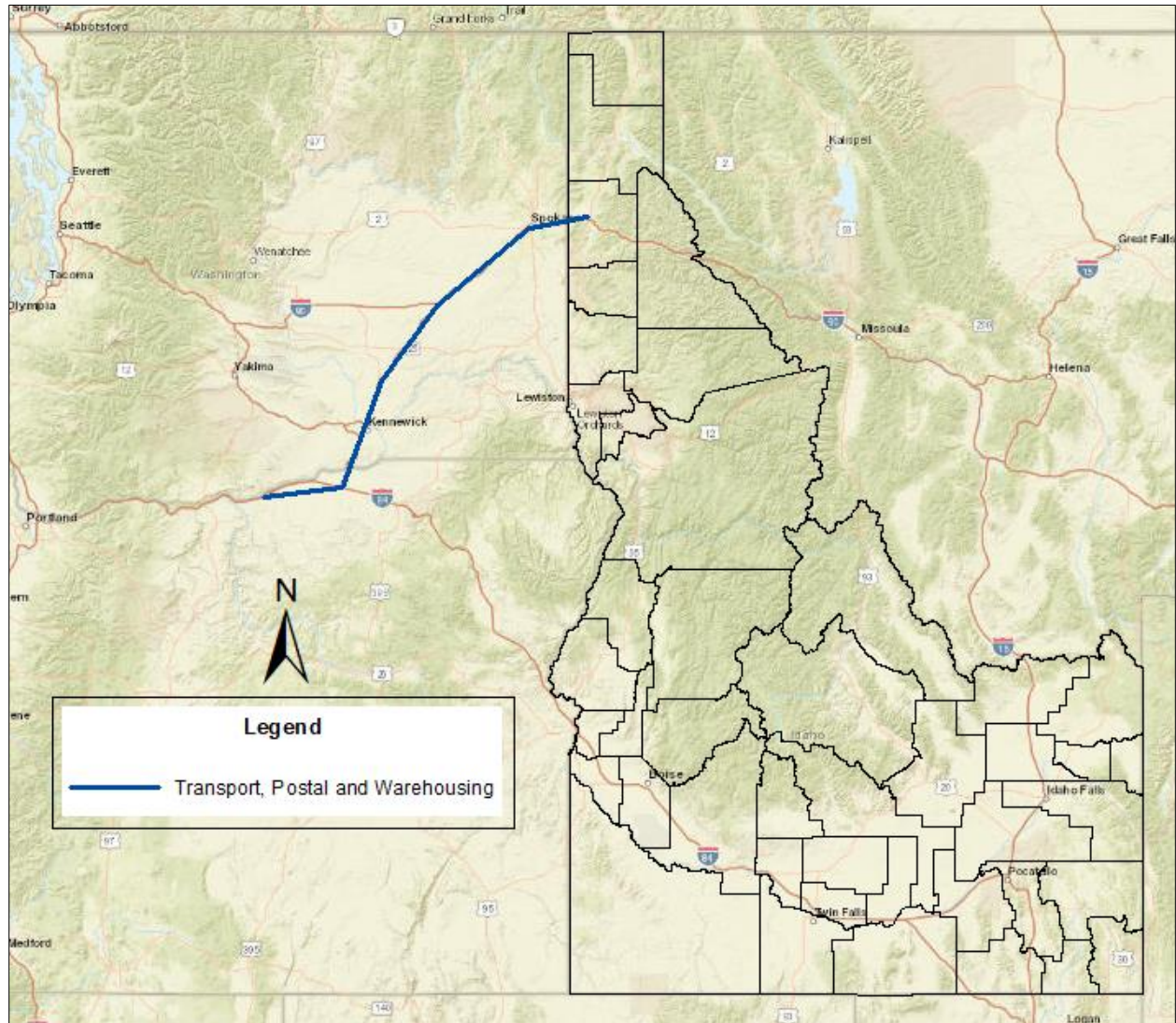


Figure 133. Transport, Postal and Warehousing Shipments Originating in Idaho

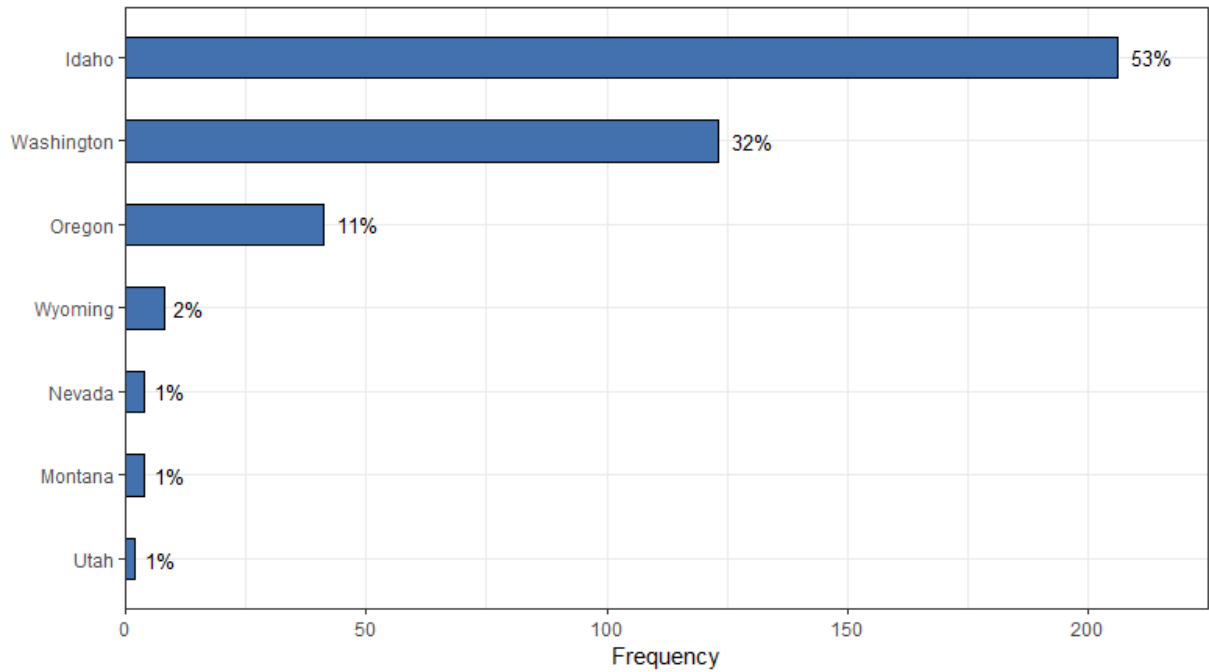


Figure 135. Destination States for Wood and Paper Products Manufacturing Shipments Originating in Idaho

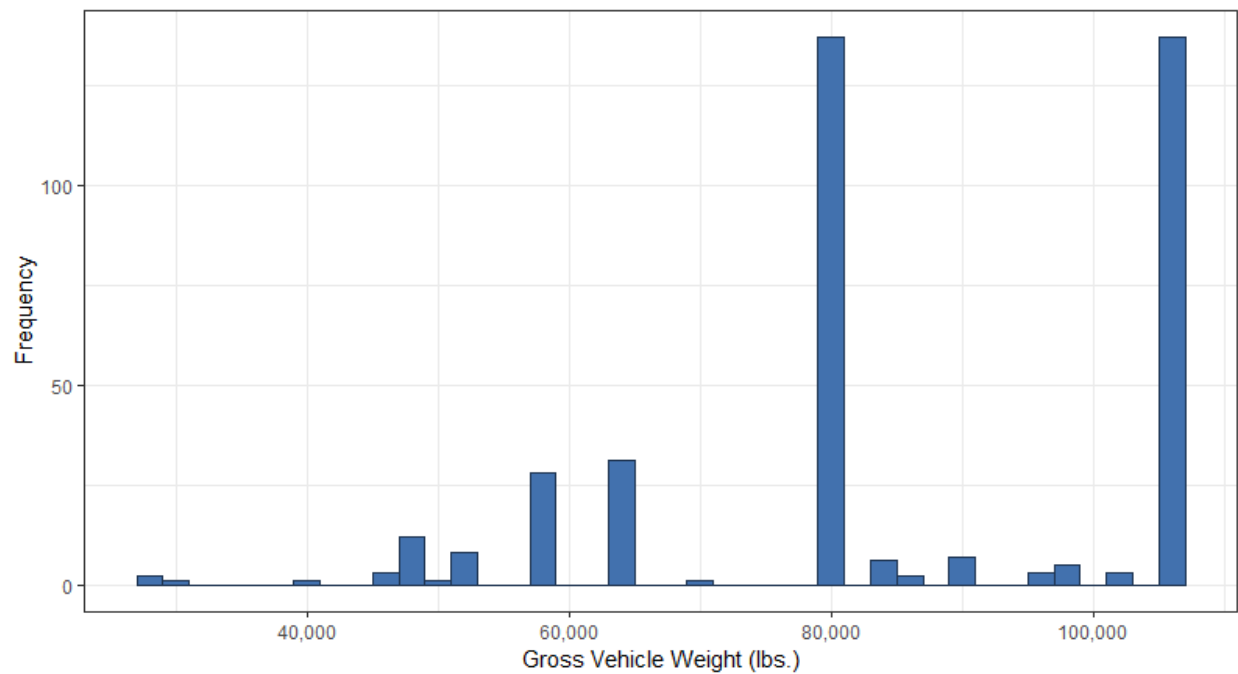


Figure 136. GVW Distribution of Wood and Paper Products Manufacturing Shipments Originating in Idaho

Information on Freight Shipment Destined to Idaho from EROAD Data

This section will present freight shipments by industry type destined to facilities in Idaho. Industries shipping freight to Idaho include:

- Accommodation and Food Services.
- Aggregates.
- Arts and Recreation Services.
- Construction.
- Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services.
- Food, Beverage, and Tobacco Product Manufacturing.
- Forestry and Logging.
- General Freight.
- General Haulage.
- Horticulture.
- Mining.
- Other Agriculture.
- Other Services.
- Owner-Occupied Property Operation (National Accounts Only).
- Private Transport.
- Refrigerated Haulage.
- Rental, Hiring, and Real Estate Services.
- Retail Trade.
- Steel and Aluminum.
- Transport Equipment, Machinery and Equipment Manufacturing.
- Transport, Postal and Warehousing.
- Wood and Paper Products Manufacturing.

The distribution of freight shipments, by industry, destined to Idaho is shown in Figure 137. The top two industry types account for greater than 60 percent of EROAD records, and are tantamount to the industry types originating from Idaho:

- Food, Beverage, and Tobacco Product Manufacturing (40.6 percent).
- General Freight (23.8 percent).

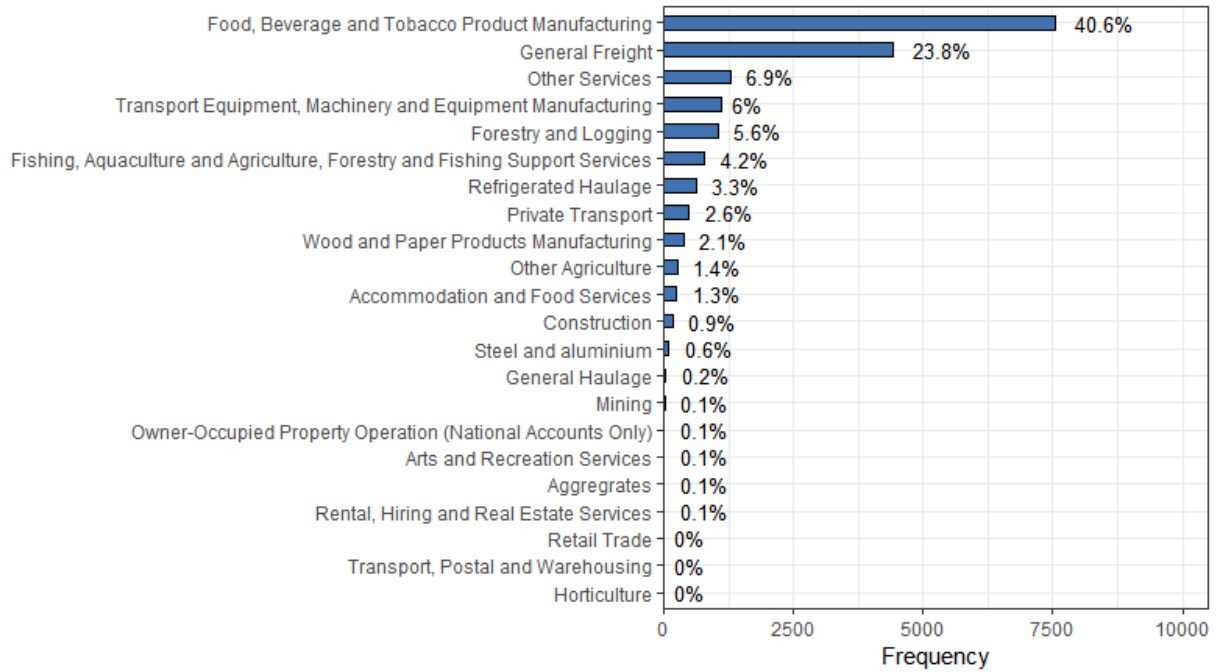


Figure 137. Proportion of Industry Types Destined to Idaho Per EROAD Data

Accommodation and Food Services

Figure 138 shows Accommodation and Food Services shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 139. In addition, GVW distribution of inbound shipments is observed in Figure 140.



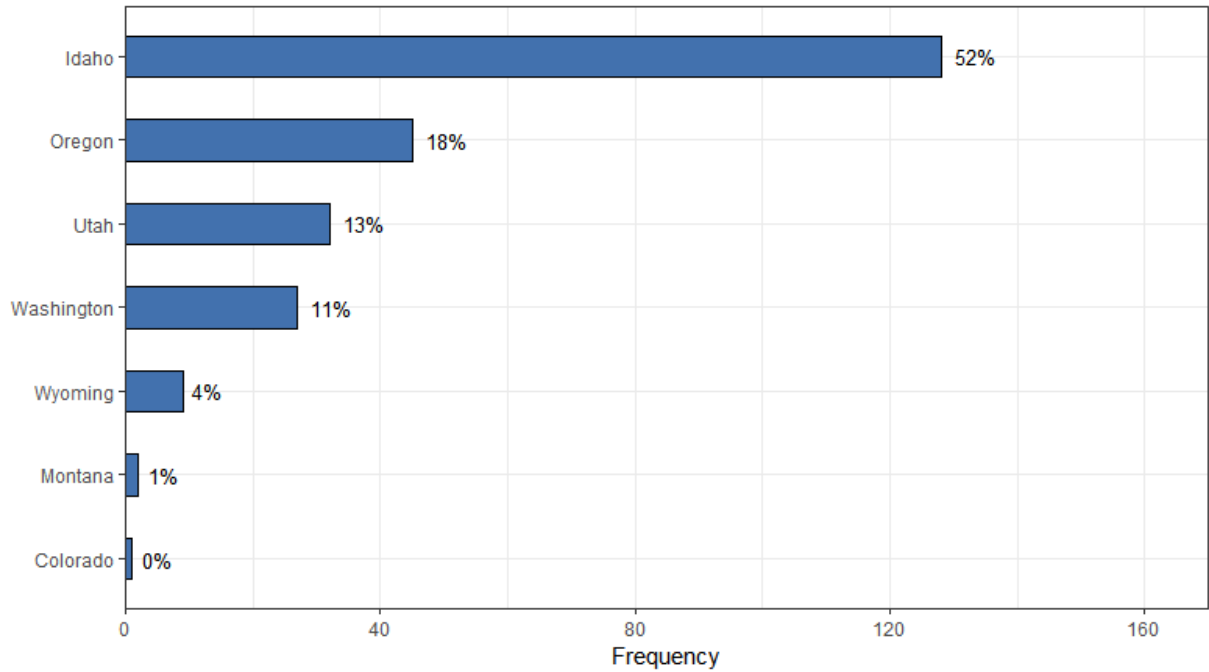


Figure 139. Originating States for Accommodation and Food Services Shipments Destined to Idaho

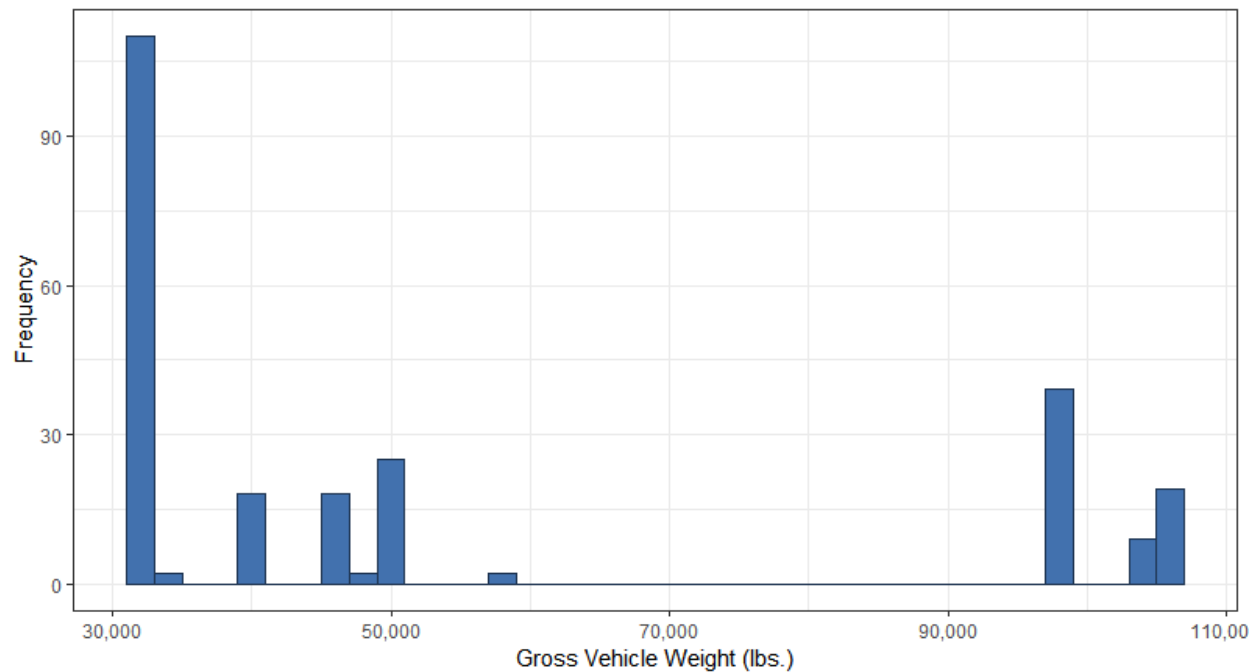


Figure 140. GVW Distribution of Accommodation and Food Services Shipments Destined to Idaho

Aggregates

Figure 141 shows Aggregates shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 142. In addition, GVW distribution of inbound shipments is observed in Figure 143.

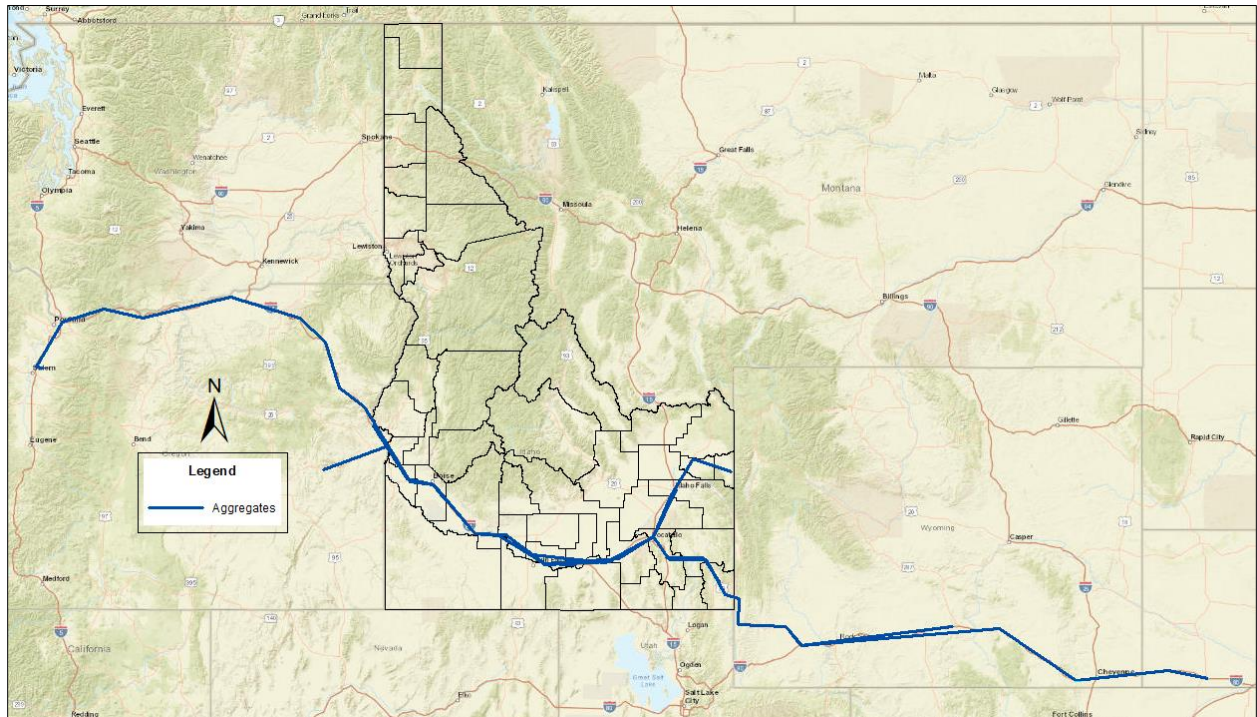


Figure 141. Aggregates Shipments Destined to Idaho

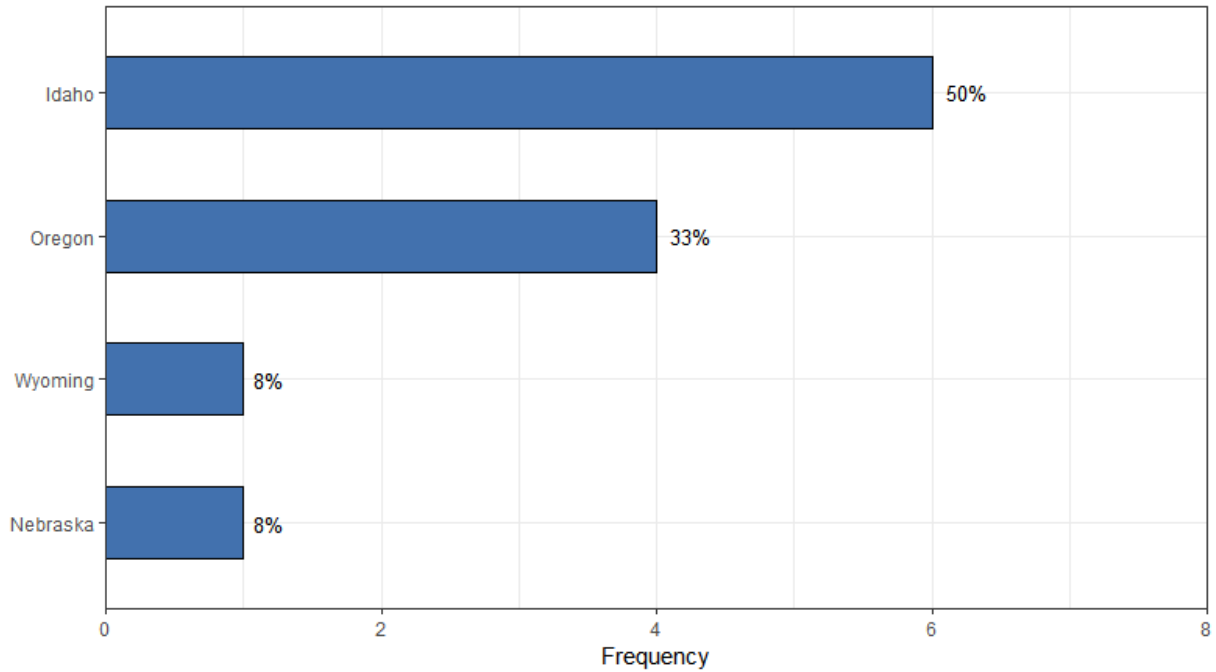


Figure 142. Originating States for Aggregate Shipments Destined to Idaho

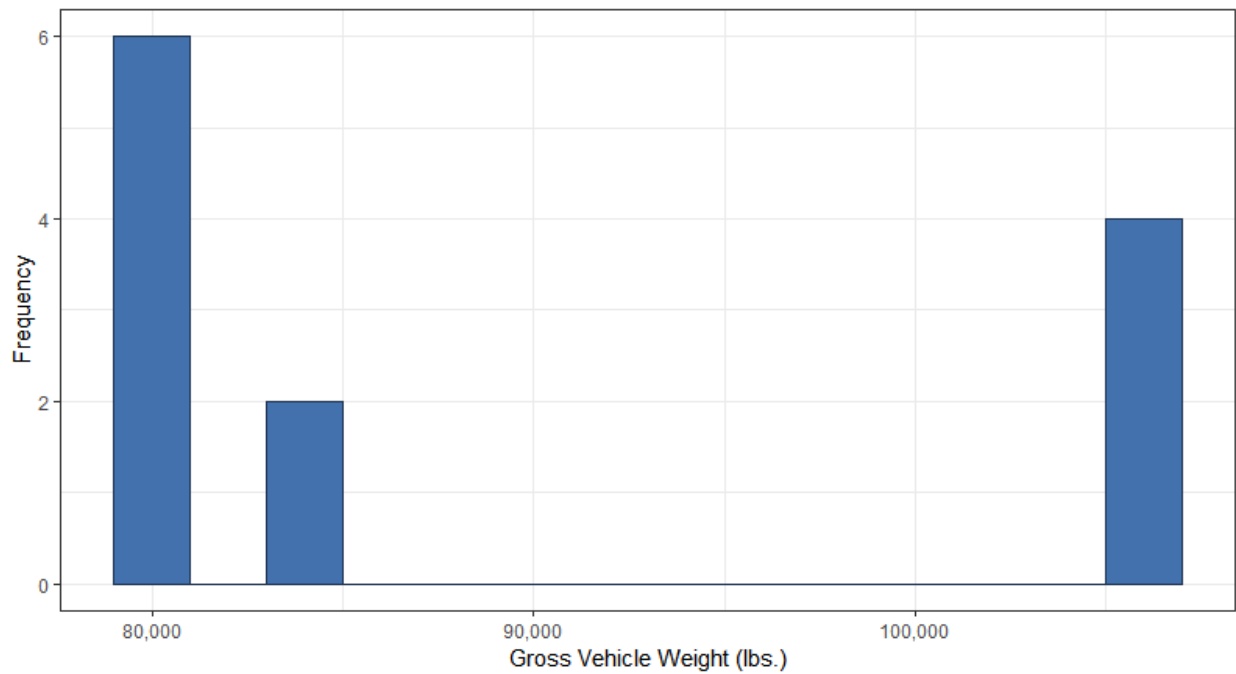


Figure 143. GVW Distribution of Aggregate Shipments Destined to Idaho

Arts and Recreation Services

Figure 144 shows Arts and Recreation Services shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 145. In the EROAD data, each shipment has a recorded GVW of 51,000 pounds.



Figure 144. Arts and Recreation Services Shipments Destined to Idaho

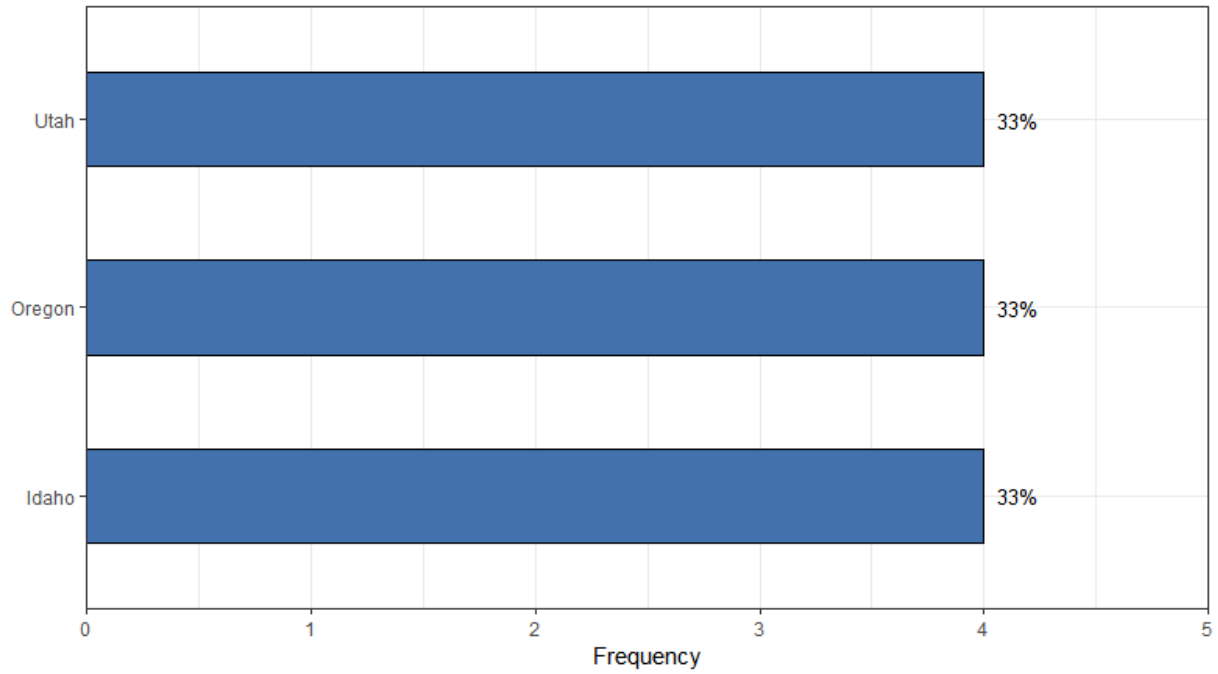
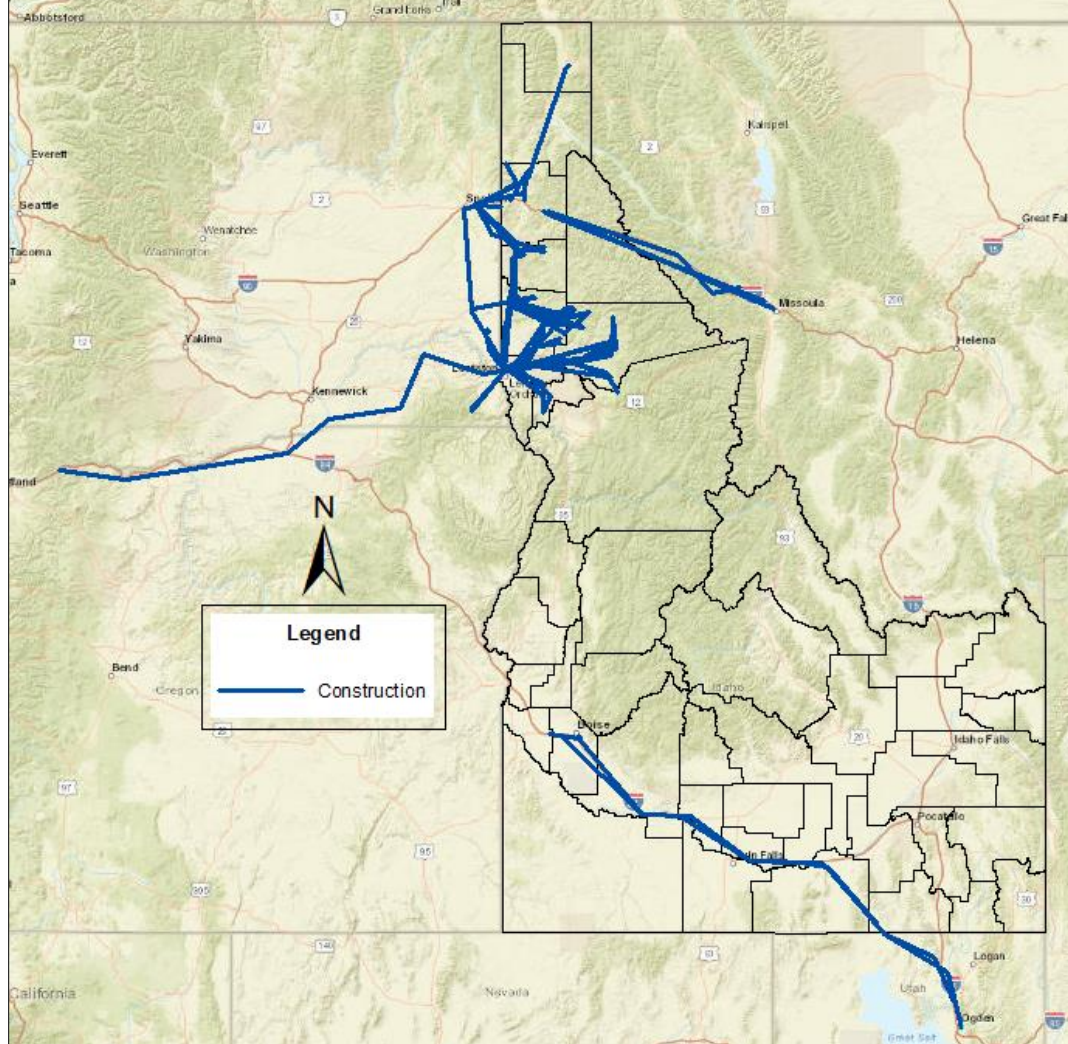


Figure 145. Originating States for Arts and Recreation Services Shipments Destined to Idaho

Figure 146 shows Construction shipments that are destined to Idaho. According to FROAD records, the



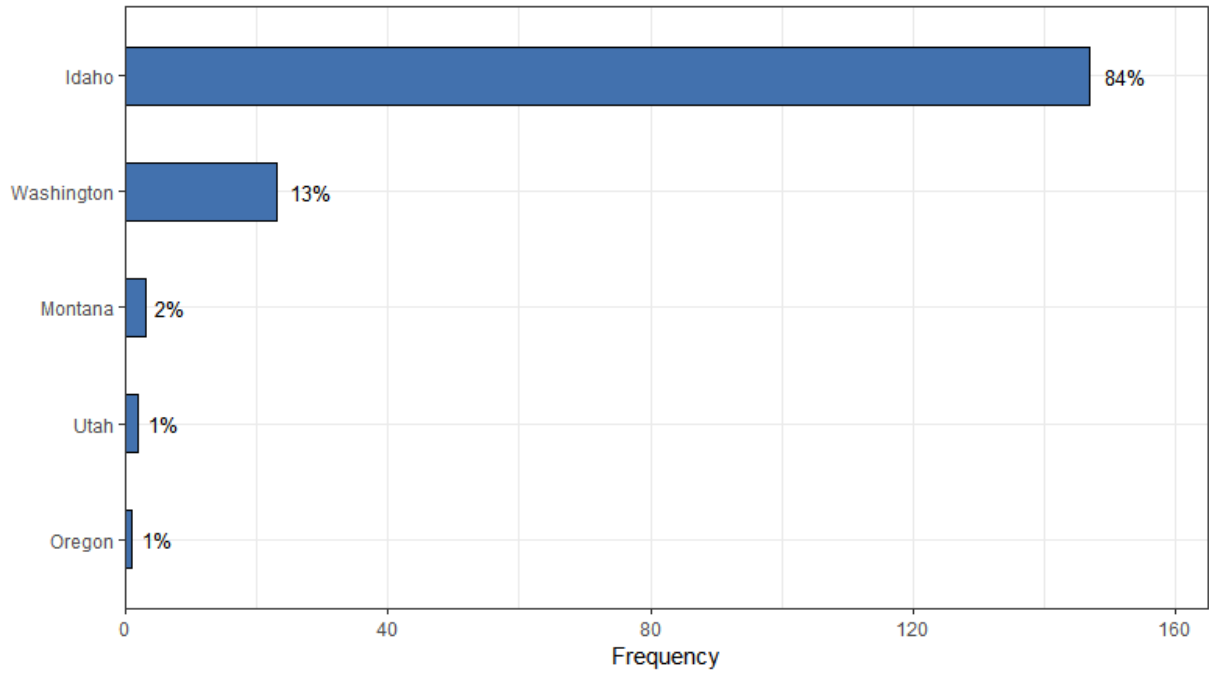


Figure 147. Originating States for Construction Shipments Destined to Idaho

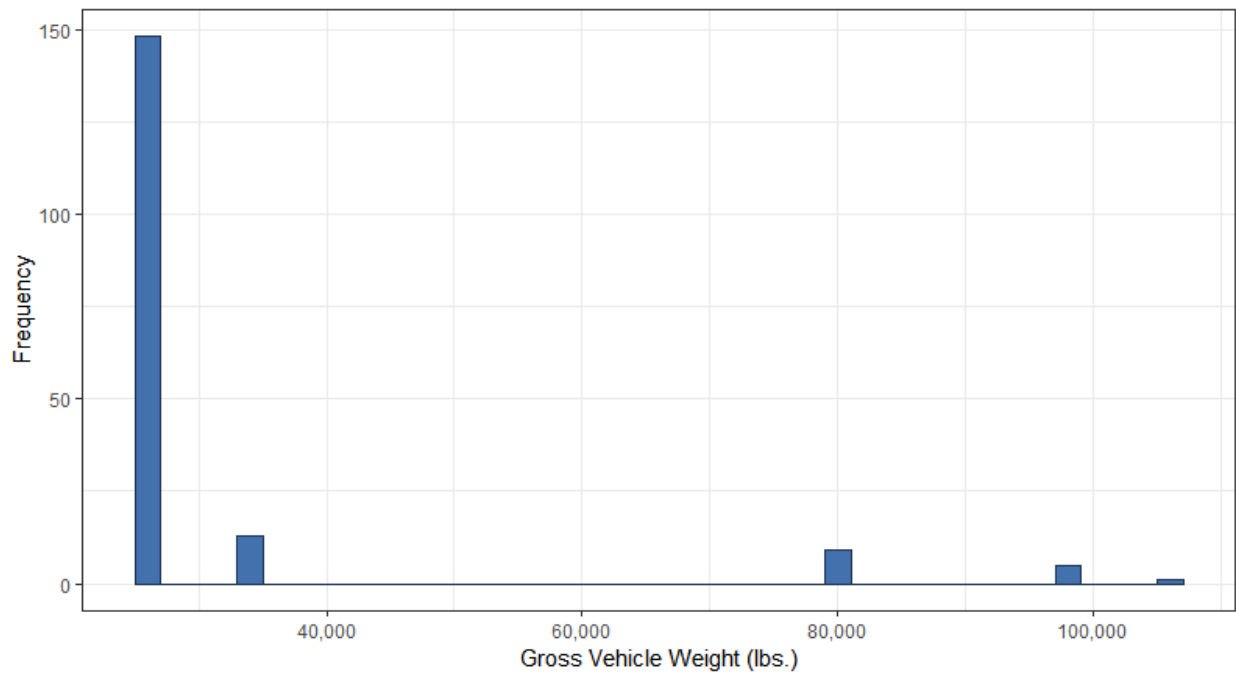


Figure 148. GVW Distribution of Construction Shipments Destined to Idaho

Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services

Figure 149 shows Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 150. In addition, GVW distribution of inbound shipments is observed in Figure 151.

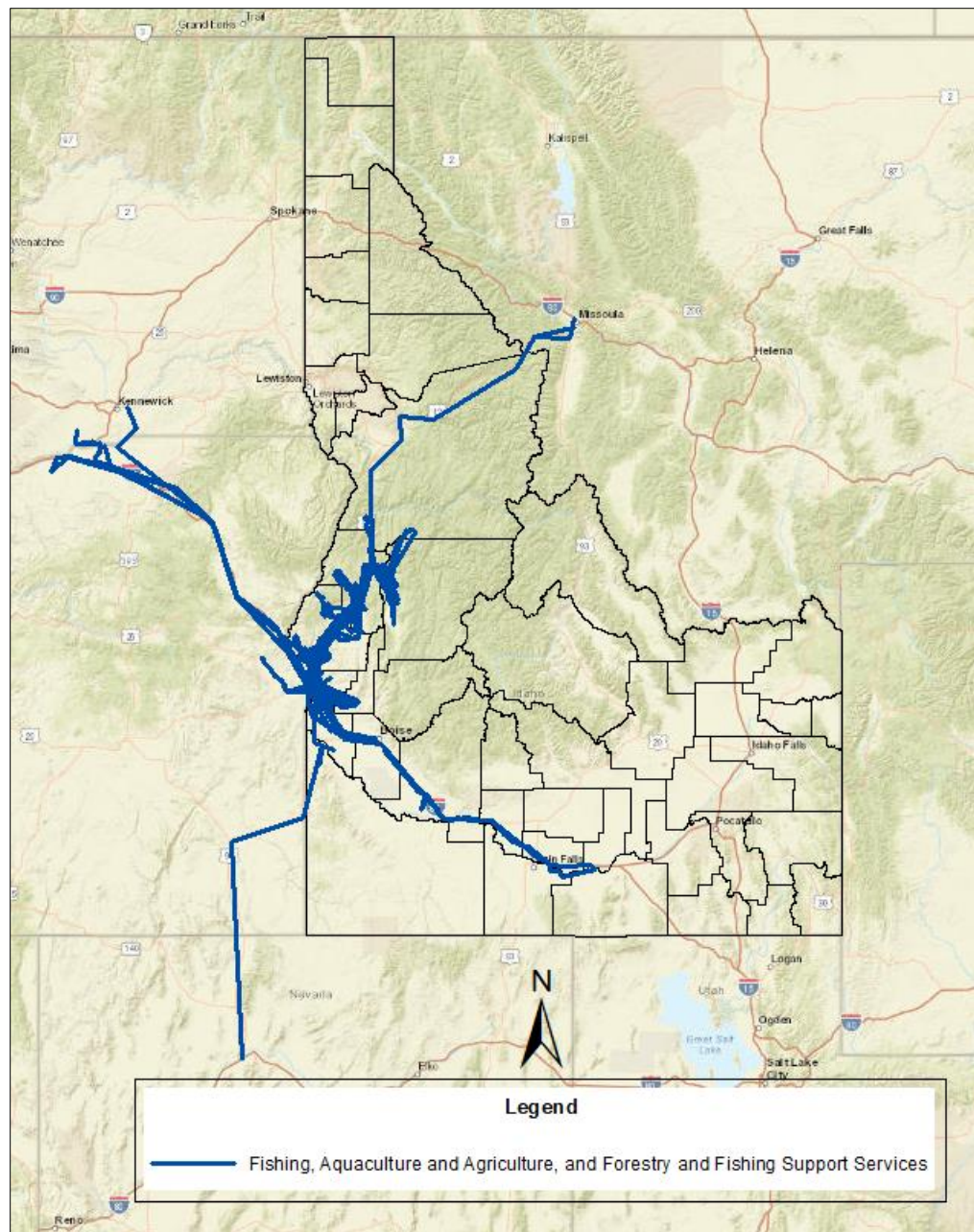


Figure 149. Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Destined to Idaho

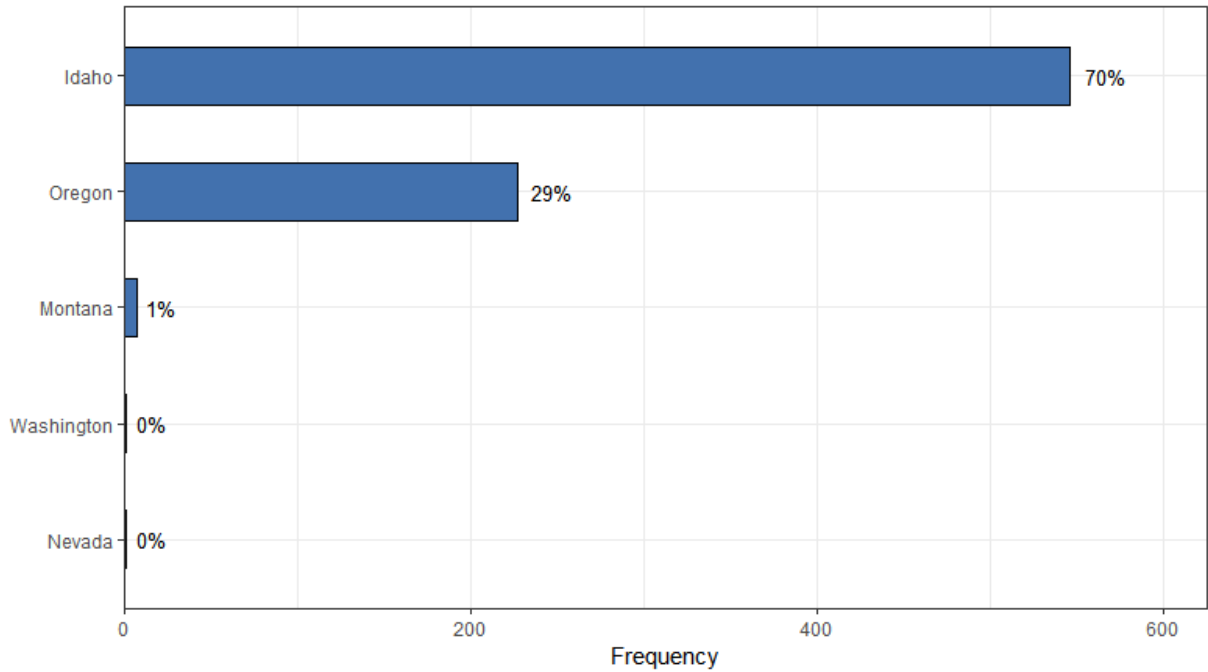


Figure 150. Originating States for Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Destined to Idaho

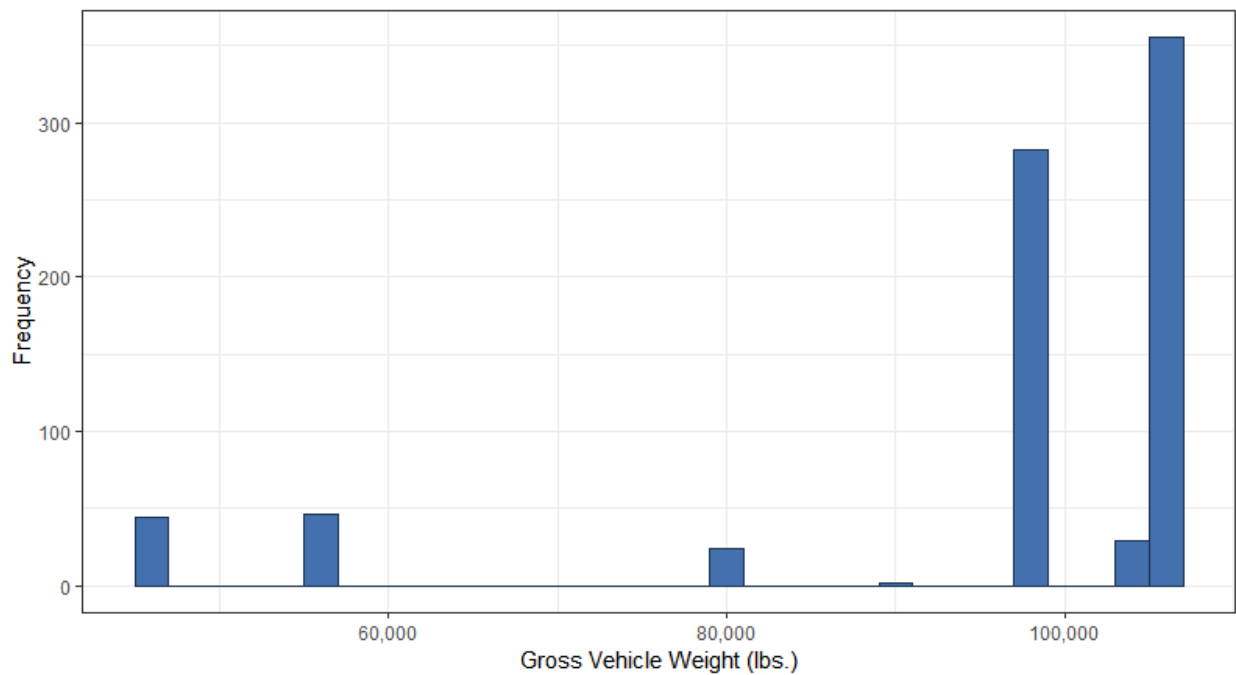


Figure 151. GVW Distribution of Fishing, Aquaculture and Agriculture, and Forestry and Fishing Support Services Shipments Destined to Idaho

Figure 152 shows Food, Beverage, and Tobacco Product Manufacturing shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 153. In addition, GVW distribution of inbound shipments is observed in Figure 154.

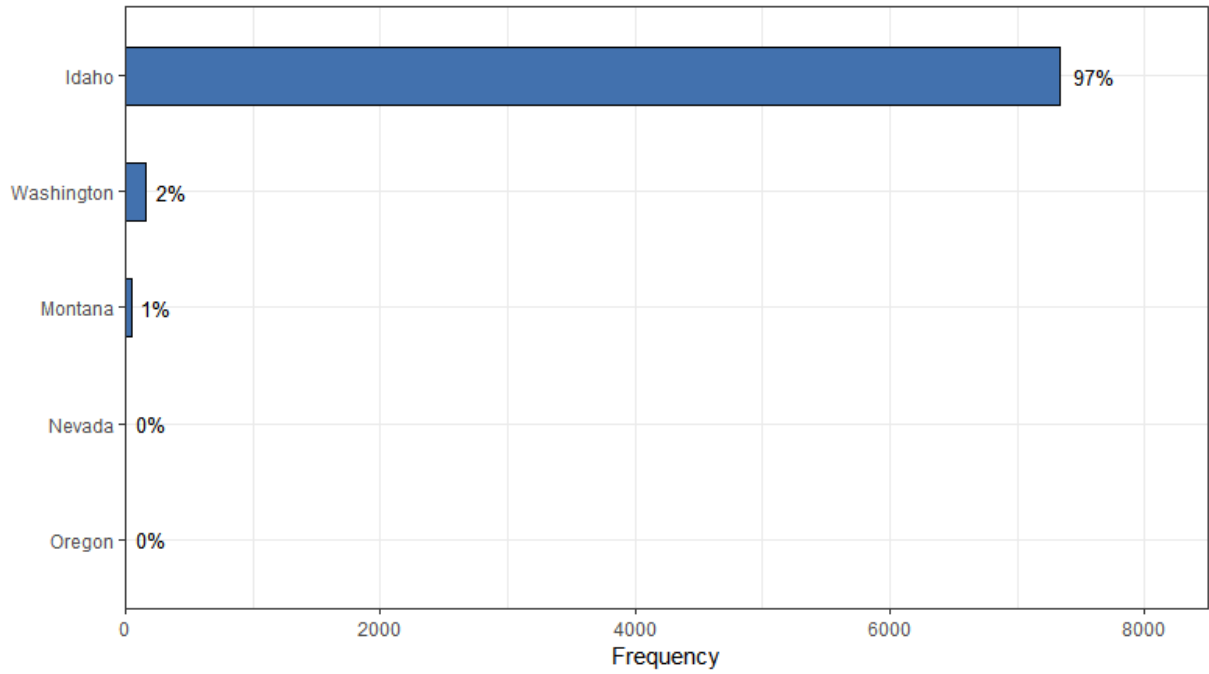


Figure 153. Originating States for Food, Beverage, and Tobacco Product Manufacturing Shipments Destined to Idaho

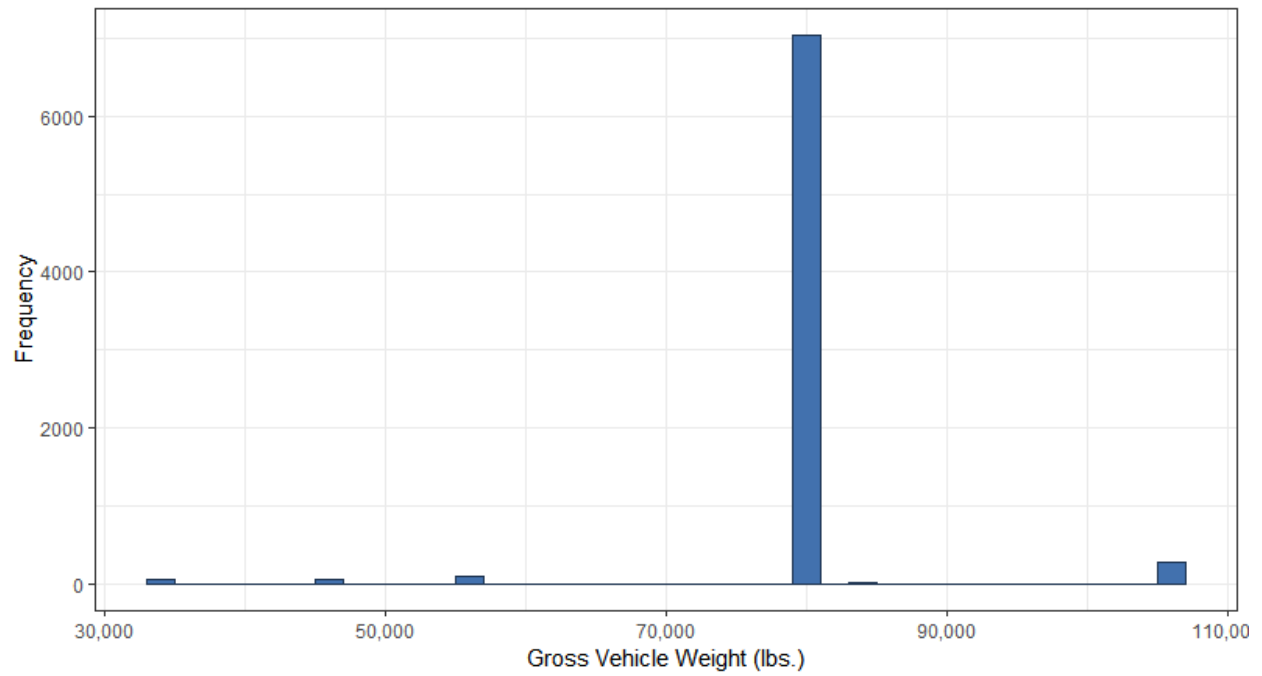


Figure 154. GVW Distribution of Food, Beverage, and Tobacco Product Manufacturing Shipments Destined to Idaho

Forestry and Logging

Figure 155 shows Forestry and Logging shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized Figure 156. In addition, GVW distribution of inbound shipments is observed in Figure 157.

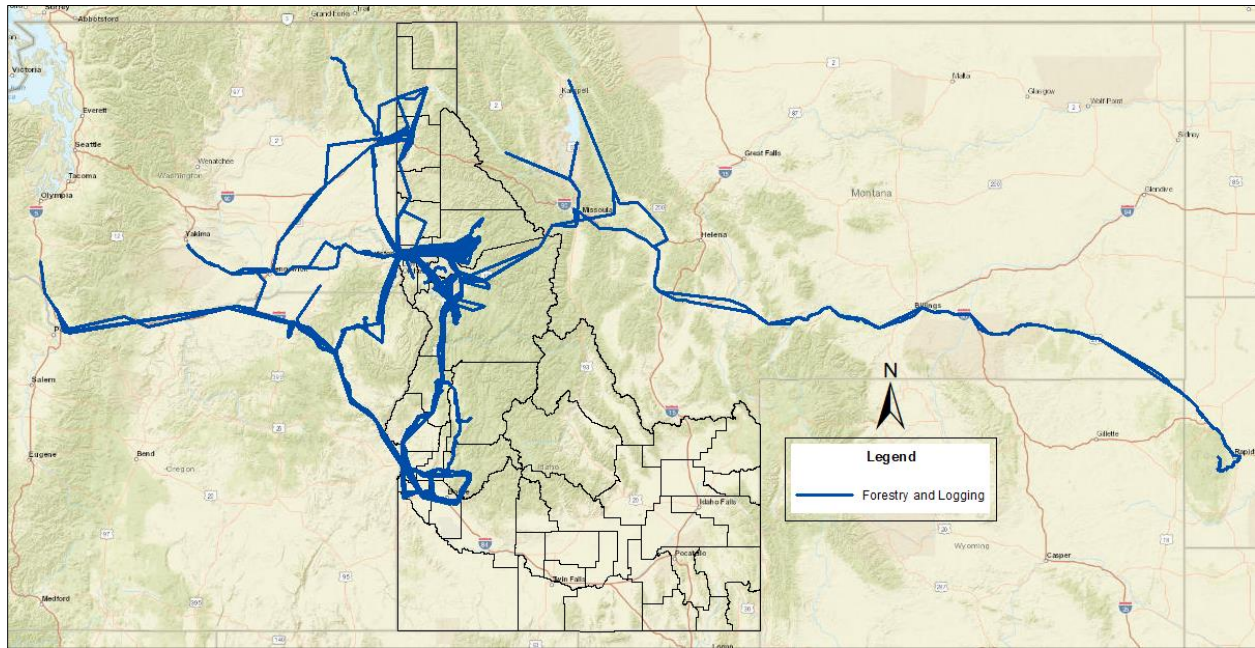


Figure 155. Forestry and Logging Shipments Destined to Idaho

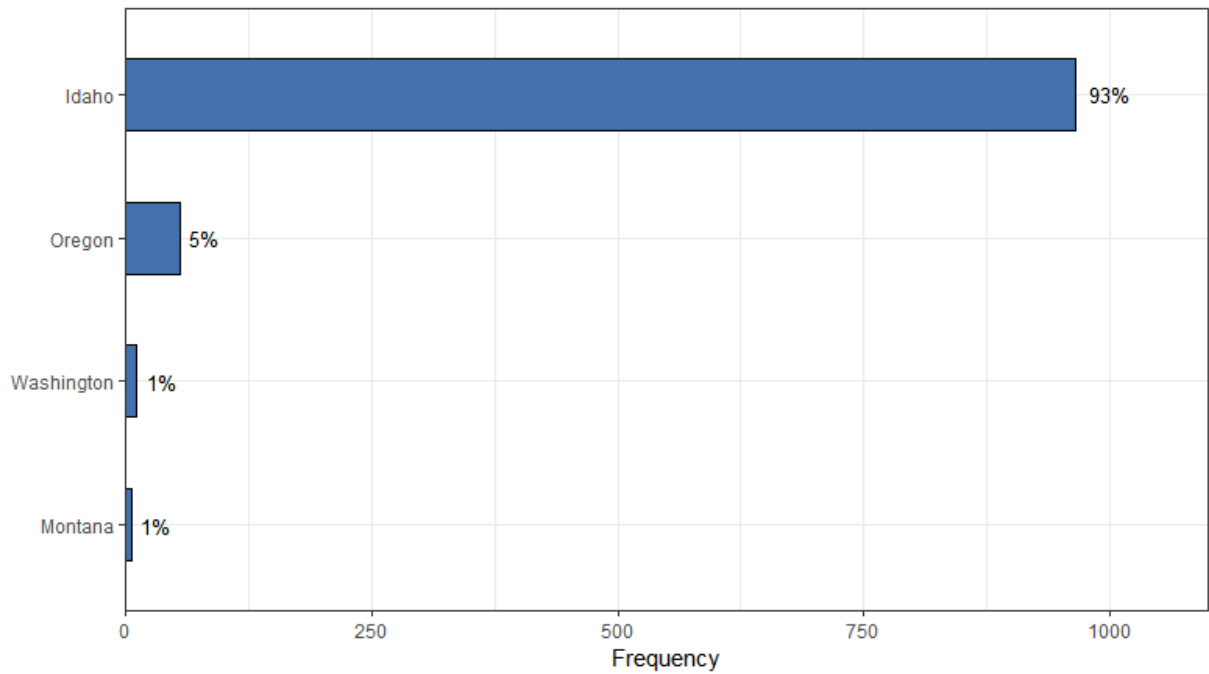


Figure 156. Originating States for Forestry and Logging Shipments Destined to Idaho

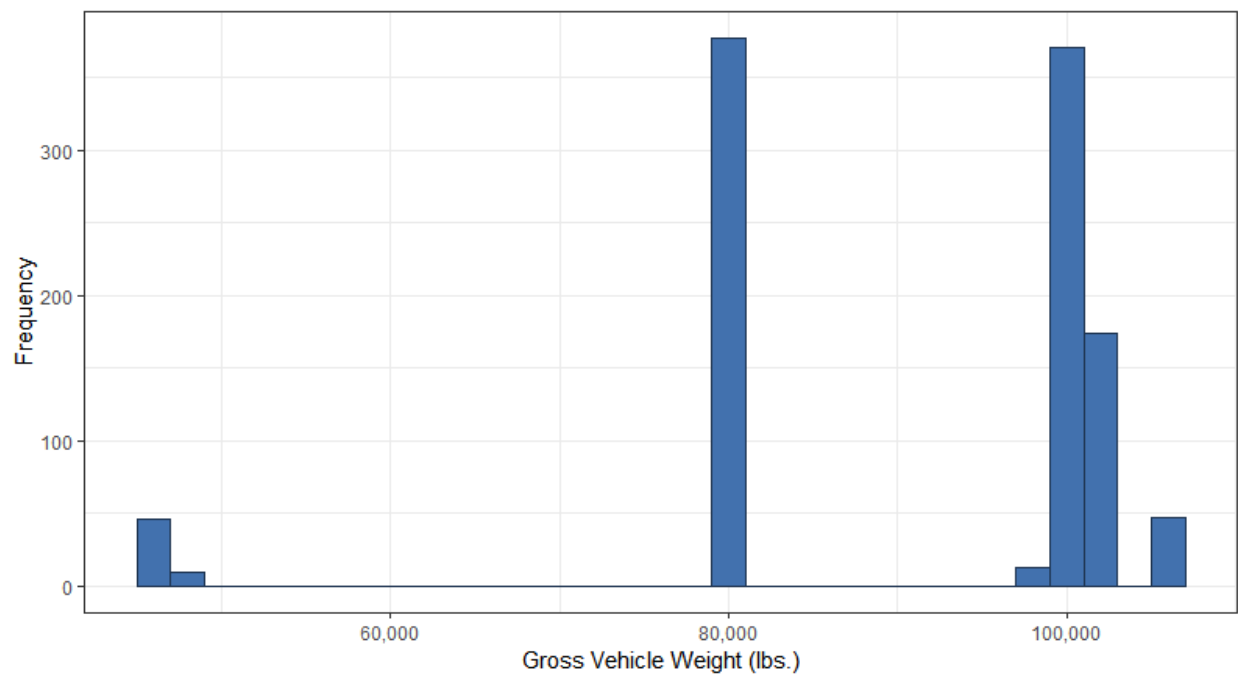


Figure 157. GVW Distribution of Forestry and Logging Shipments Destined to Idaho

General Freight

Figure 158 shows General Freight shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 159. In addition, GVW distribution of inbound shipments is observed in Figure 160.



Figure 158. General Freight Shipments Destined to Idaho

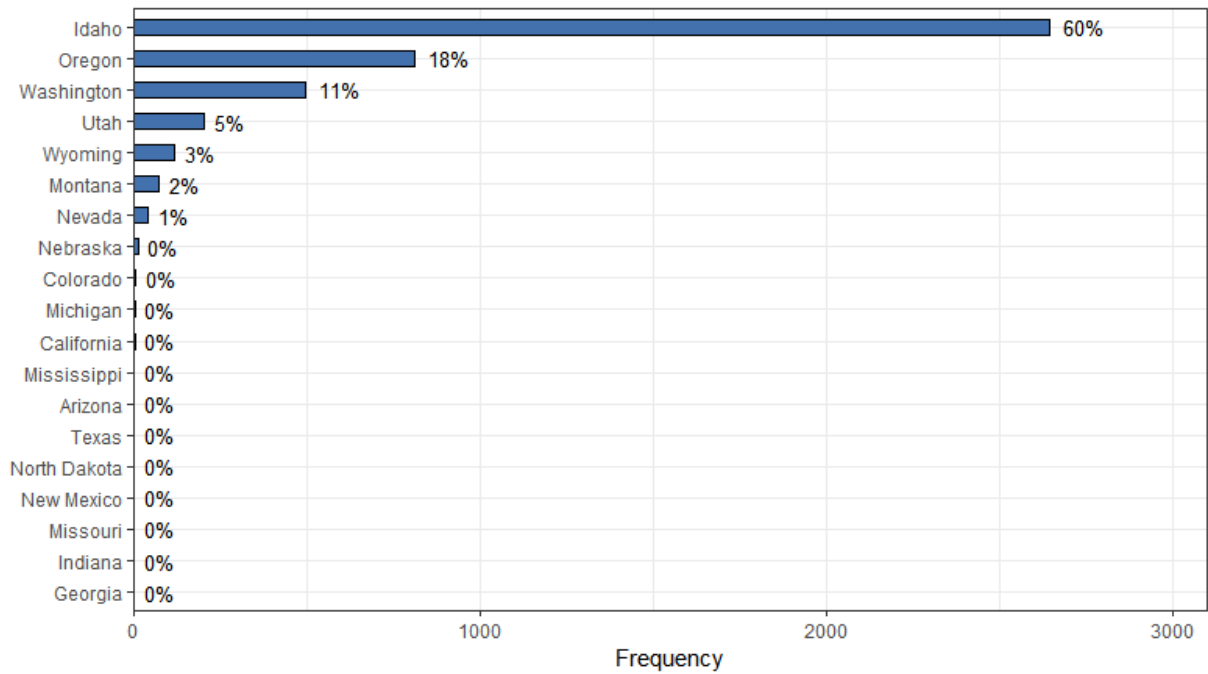


Figure 159. Originating States for General Freight Shipments Destined to Idaho

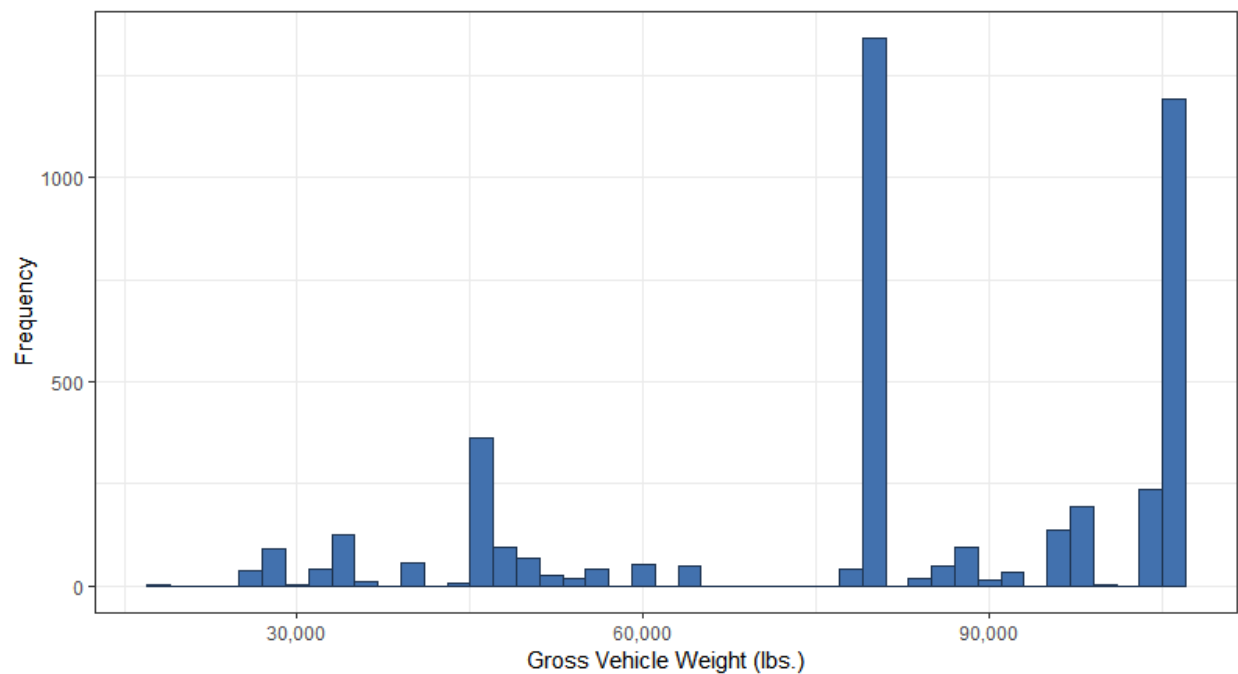


Figure 160. GVW Distribution of General Freight Shipments Destined to Idaho

General Haulage

Figure 161 shows General Haulage shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 162. In addition, GVW distribution of inbound shipments is observed in Figure 163.

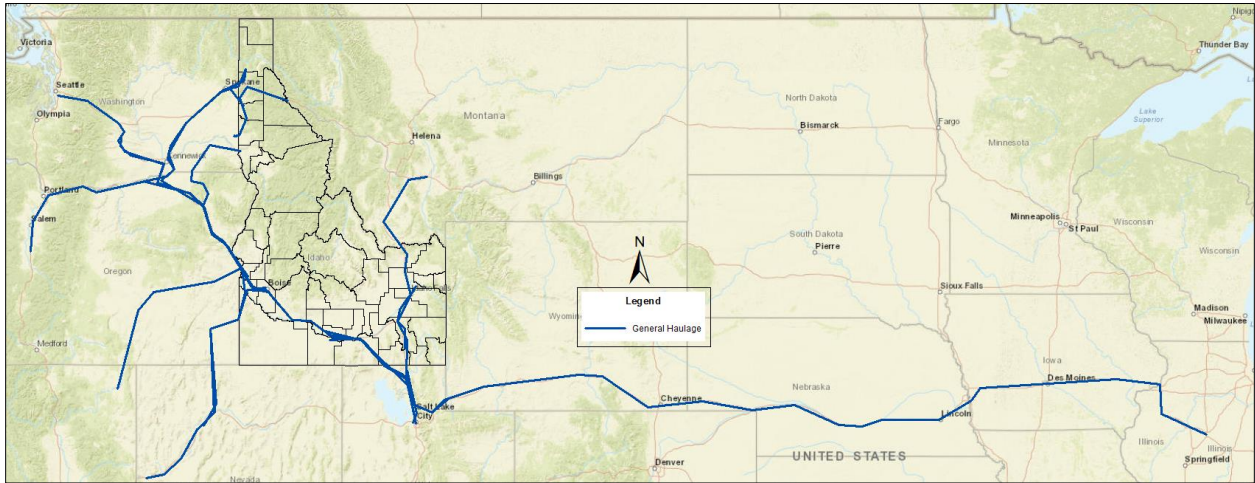


Figure 161. General Haulage Shipments Destined to Idaho

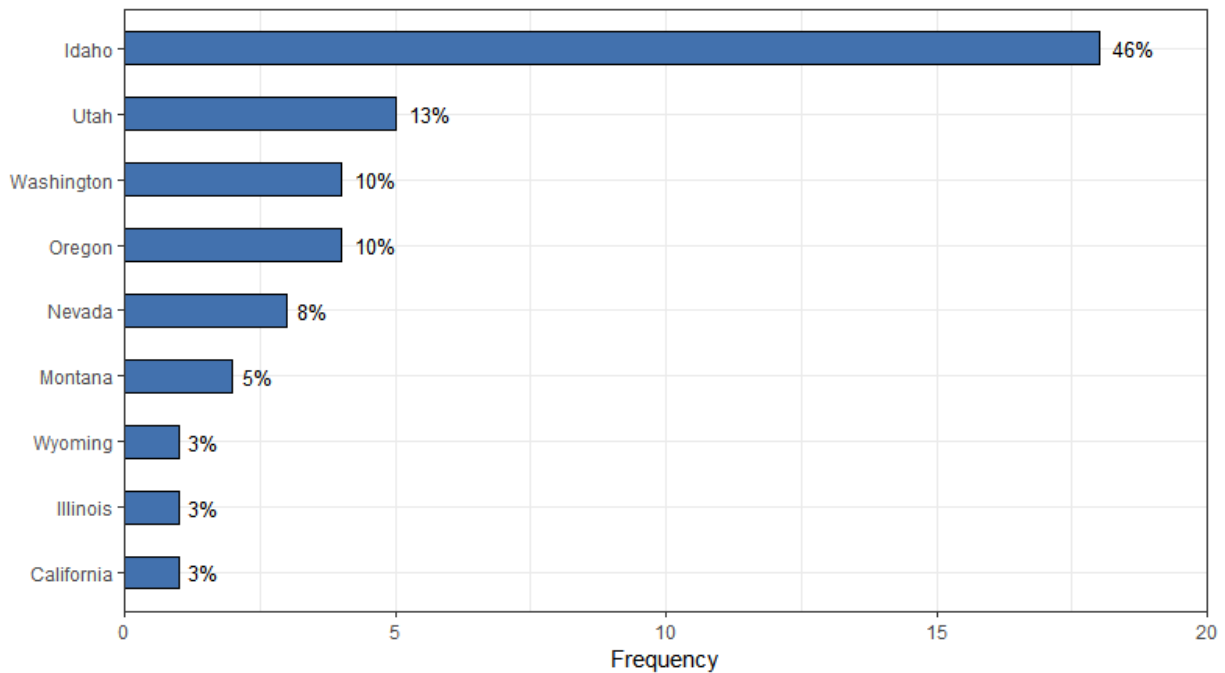


Figure 162. Originating States for General Haulage Shipments Destined to Idaho

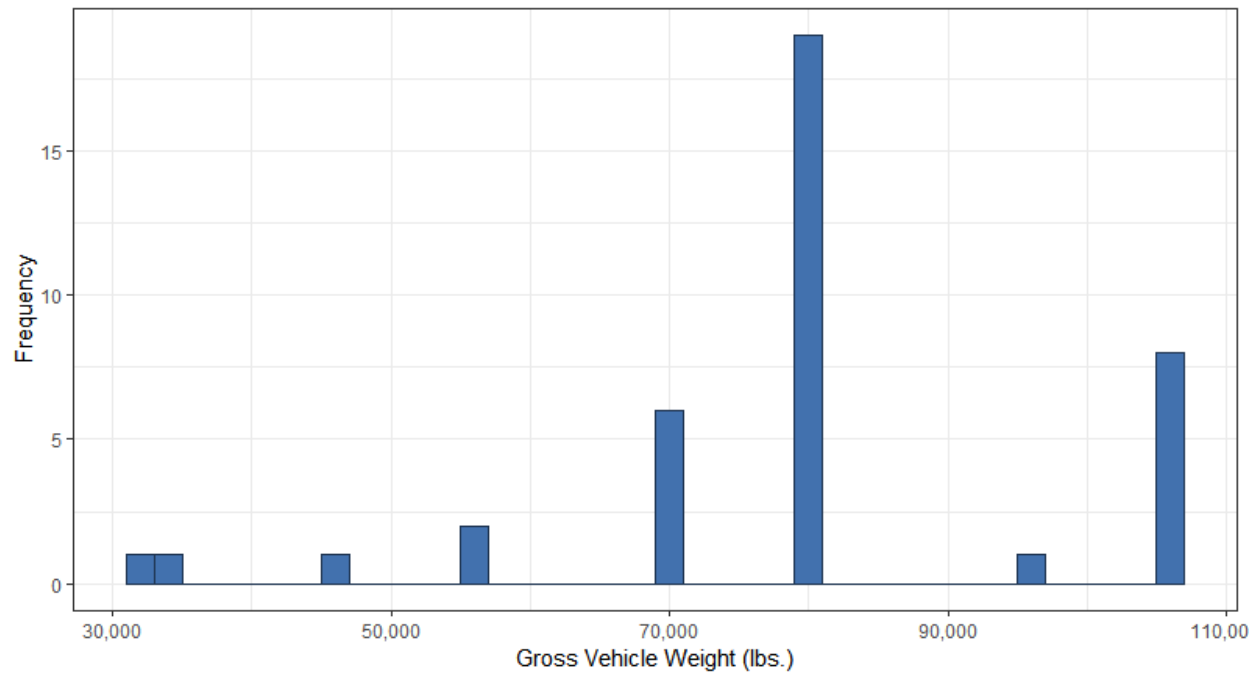


Figure 163. GVW Distribution of General Haulage Shipments Destined to Idaho

Horticulture

Figure 164 shows General Haulage shipments that are destined to Idaho. According to EROAD records, the single shipment was originating from Oregon and had a recorded GVW of 54,000 pounds.

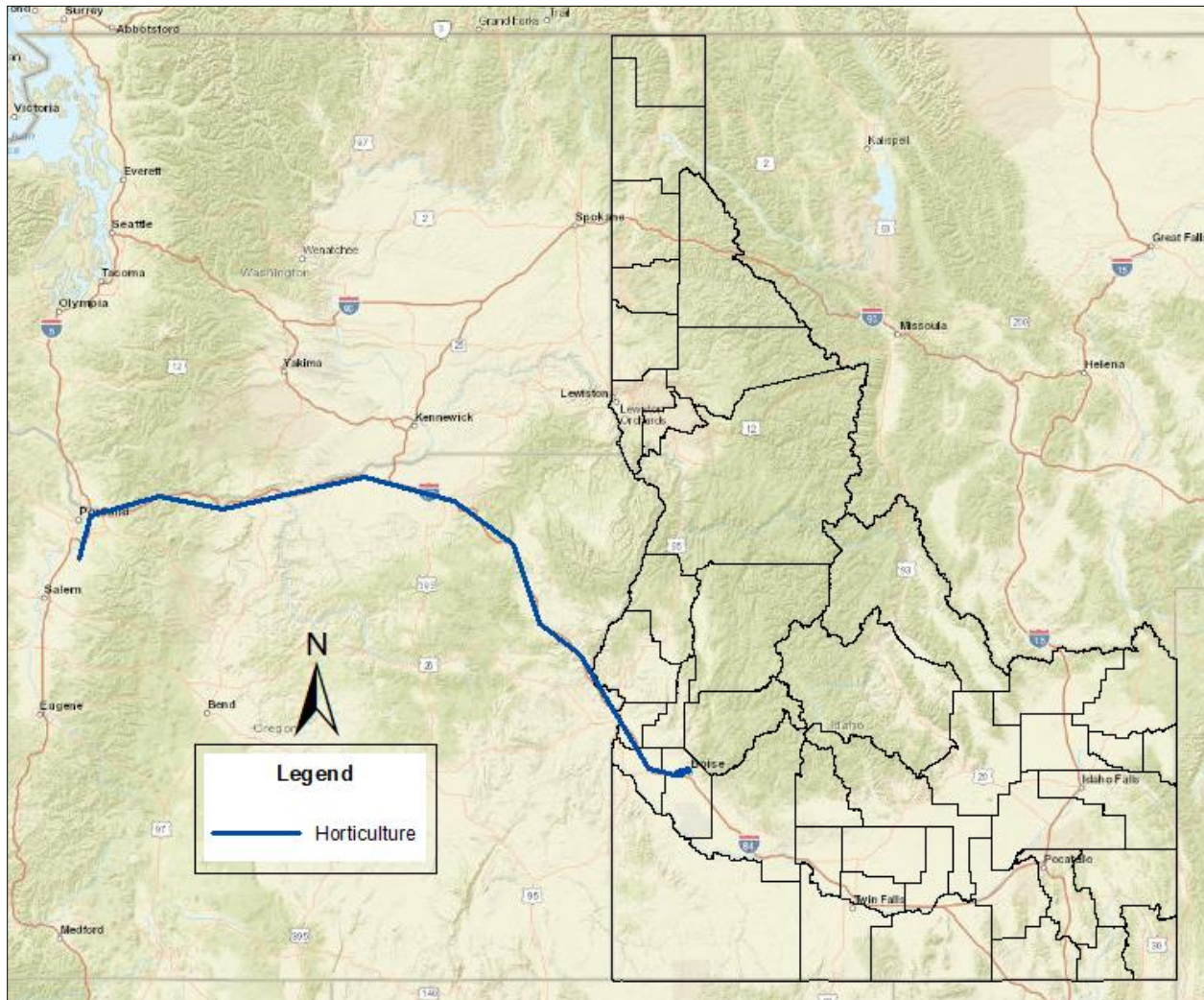


Figure 164. Horticulture Shipments Destined to Idaho

Mining

Figure 165 shows Mining shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 166. In addition, GVW distribution of inbound shipments is observed in Figure 167.

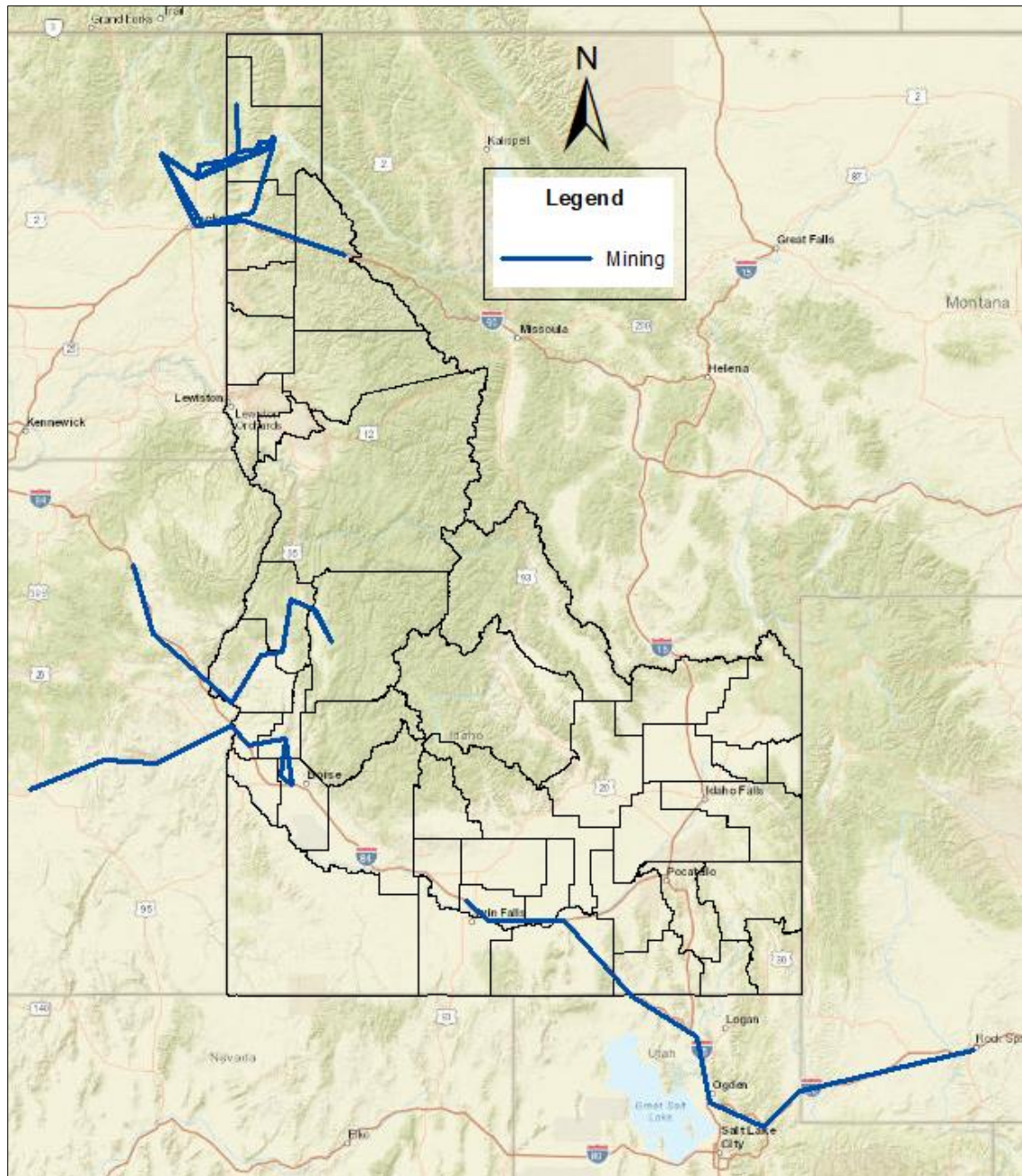


Figure 165. Mining Shipments Destined to Idaho

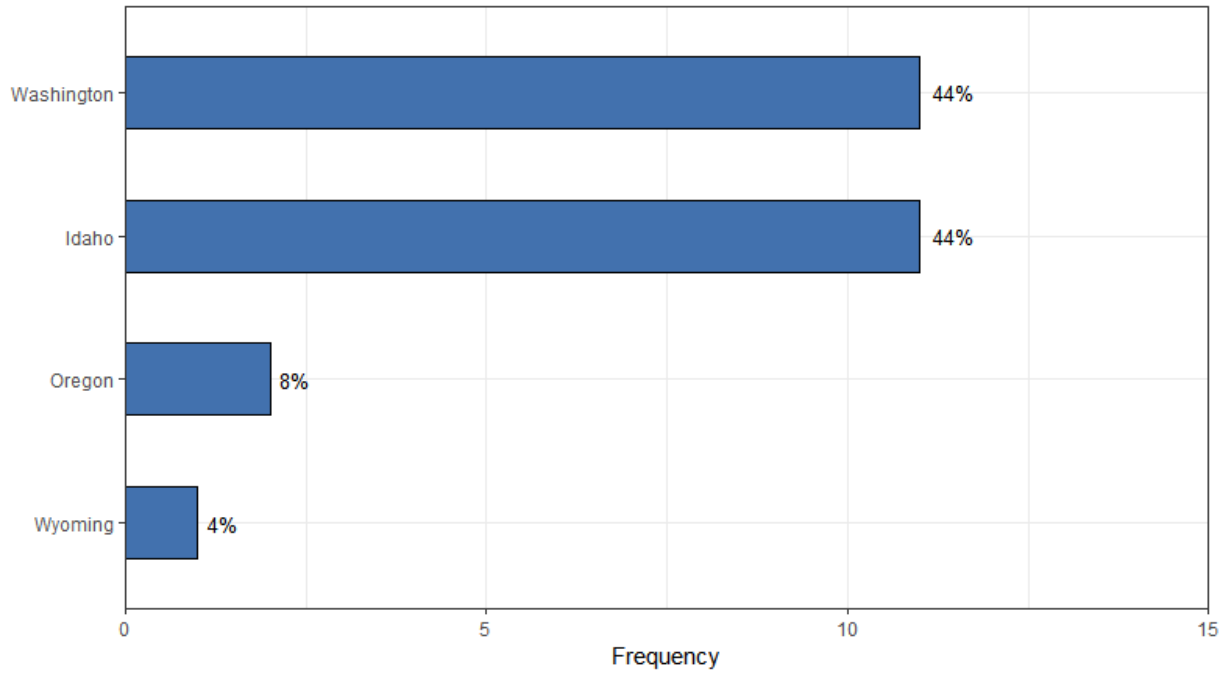


Figure 166. Originating States for Mining Shipments Destined to Idaho

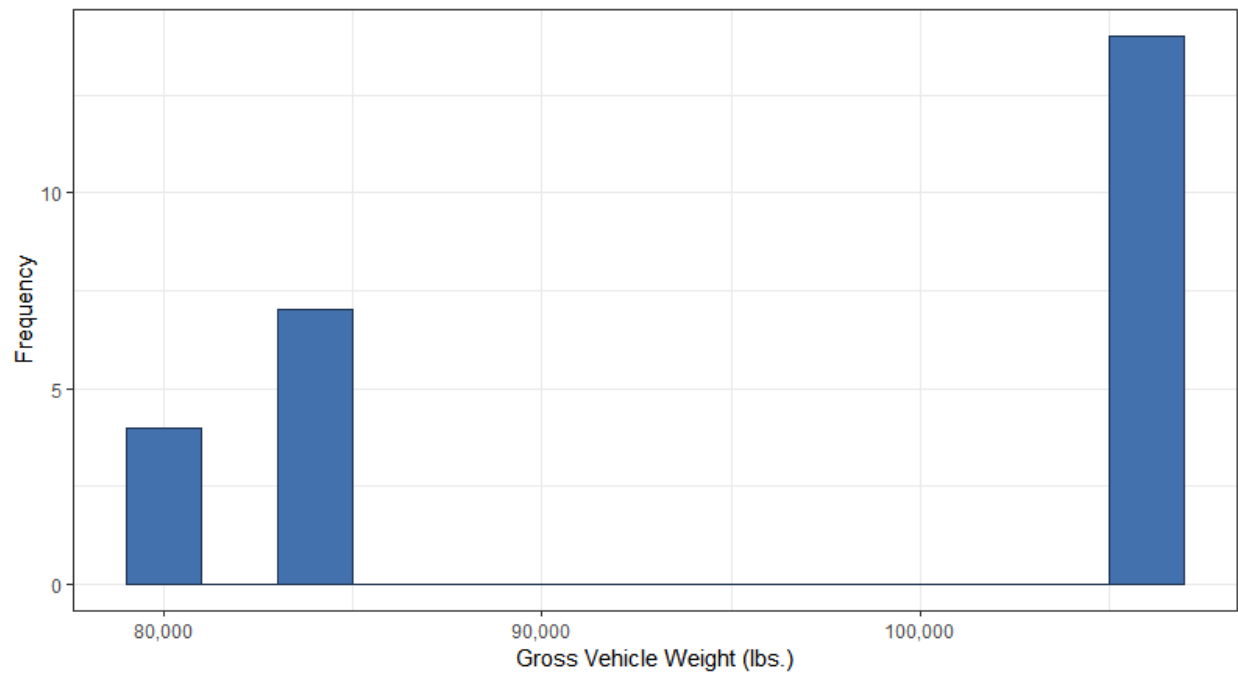


Figure 167. GVW Distribution of Mining Shipments Destined to Idaho

Other Agriculture

Figure 168 shows Other Agriculture shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 169. In addition, GVW distribution of inbound shipments is observed in Figure 170.



Figure 168. Other Agriculture Shipments Destined to Idaho

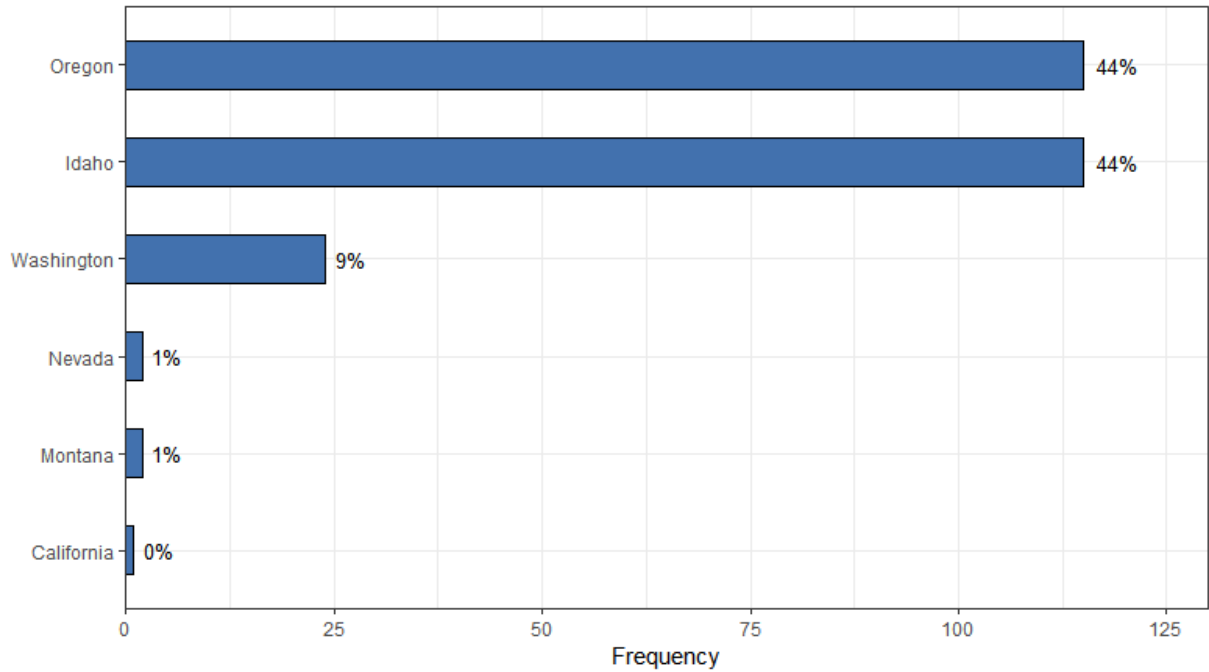


Figure 169. Originating States for Other Agriculture Shipments Destined to Idaho

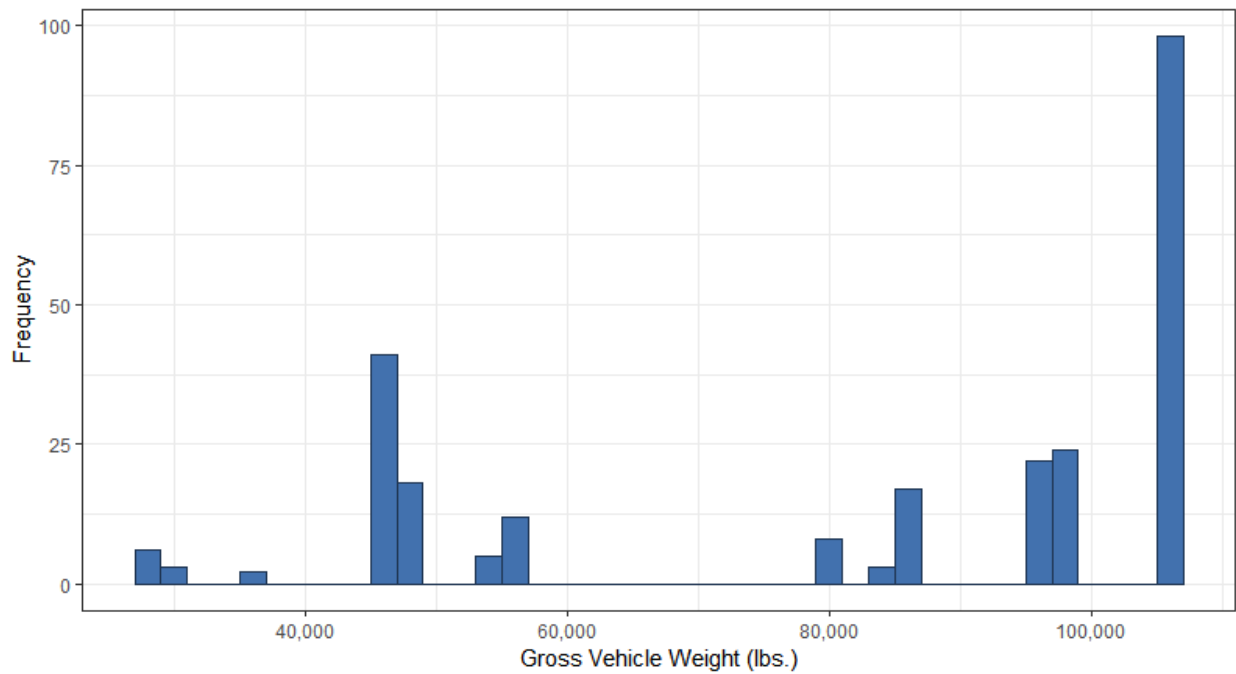


Figure 170. GVW Distribution of Other Agriculture Shipments Destined to Idaho

Other Services

Figure 171 shows Other Services shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 172. In addition, GVW distribution of inbound shipments is observed in Figure 173.

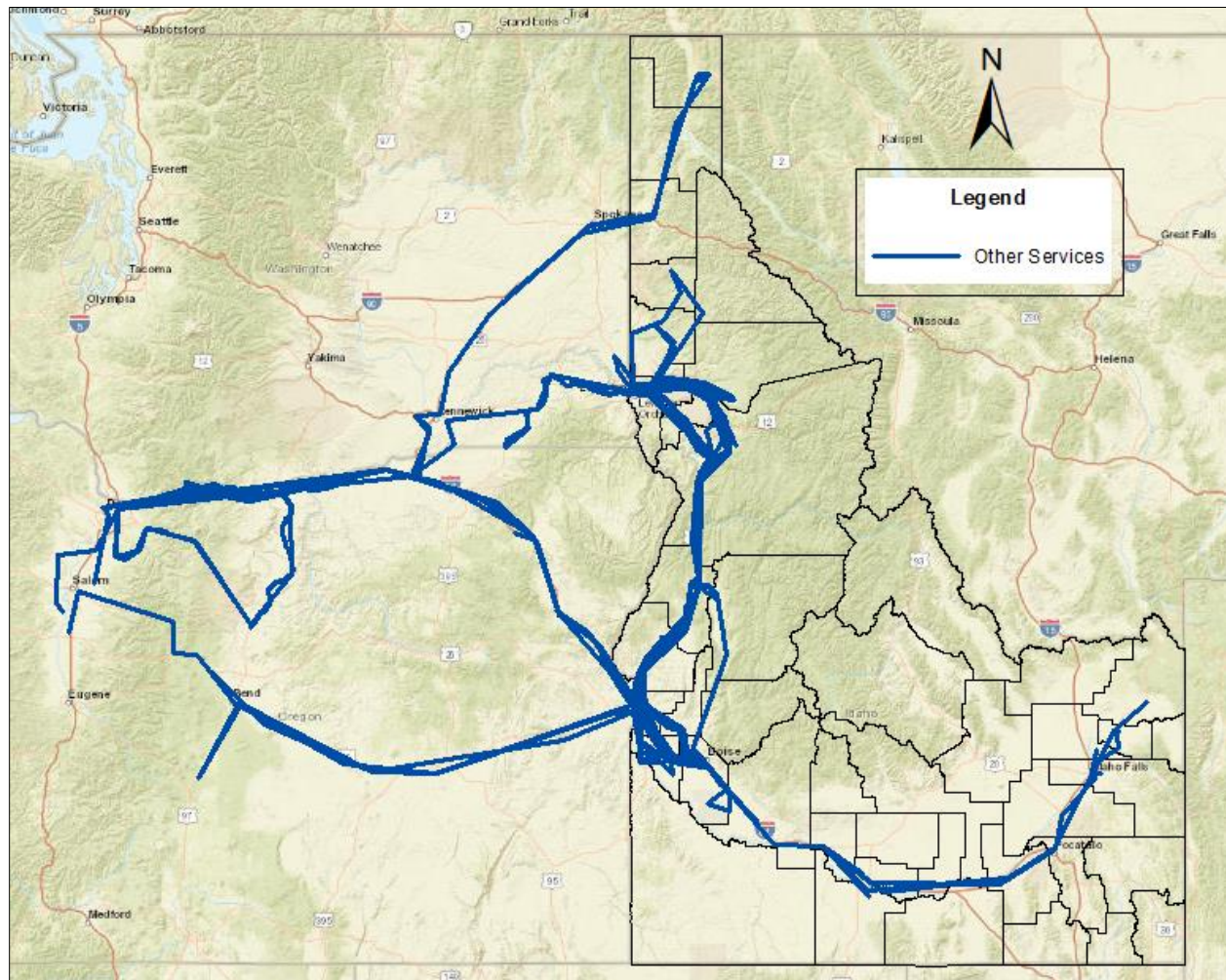


Figure 171. Other Services Shipments Destined to Idaho

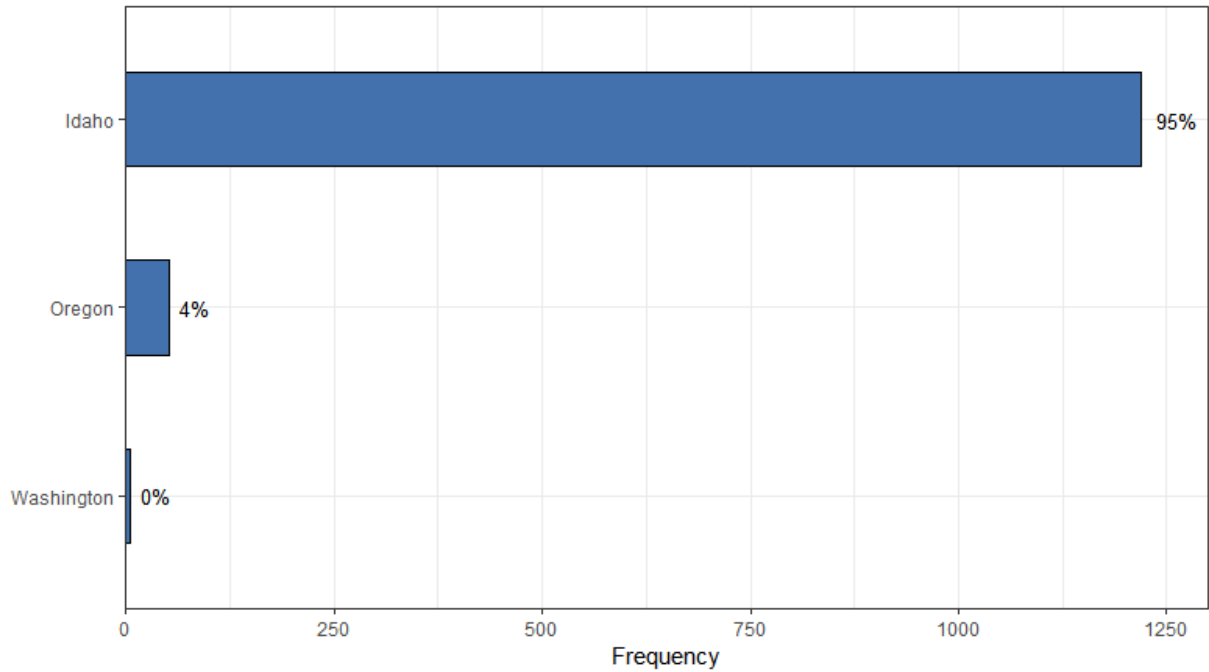


Figure 172. Originating States for Other Services Shipments Destined to Idaho

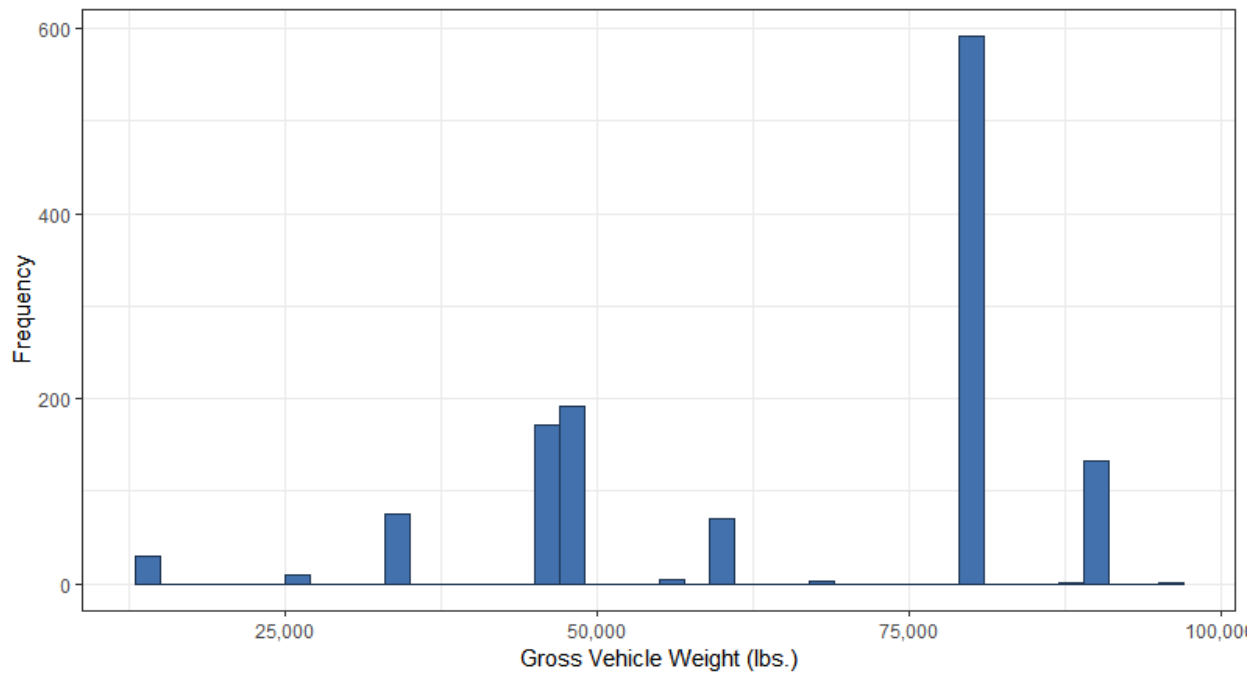
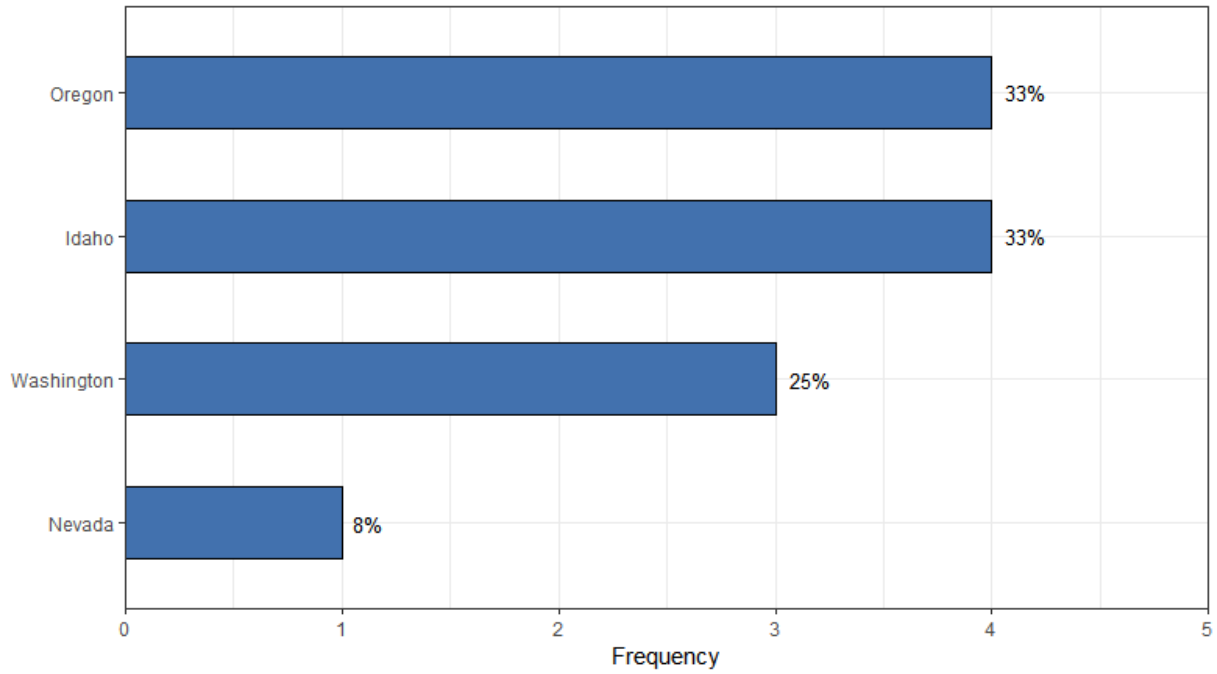


Figure 173. GVW Distribution of Other Services Shipments Destined to Idaho



**Figure 175. Originating States for Owner-Occupied Property Operation (National Accounts Only)
Shipments Destined to Idaho**

Private Transport

Figure 176 shows Private Transport shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 177. In addition, GVW distribution of inbound shipments is observed in Figure 178.

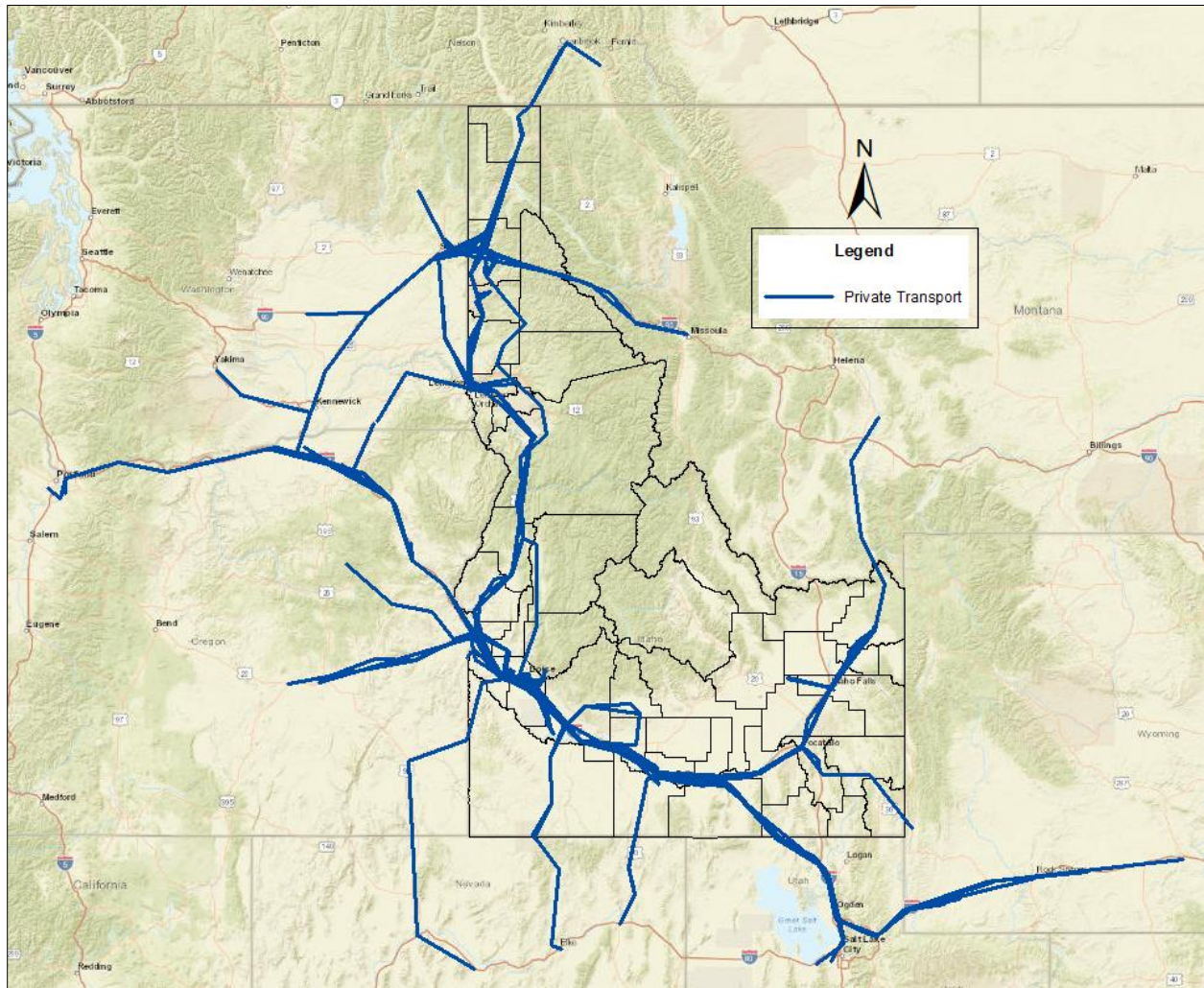


Figure 176. Private Transport Shipments Destined to Idaho

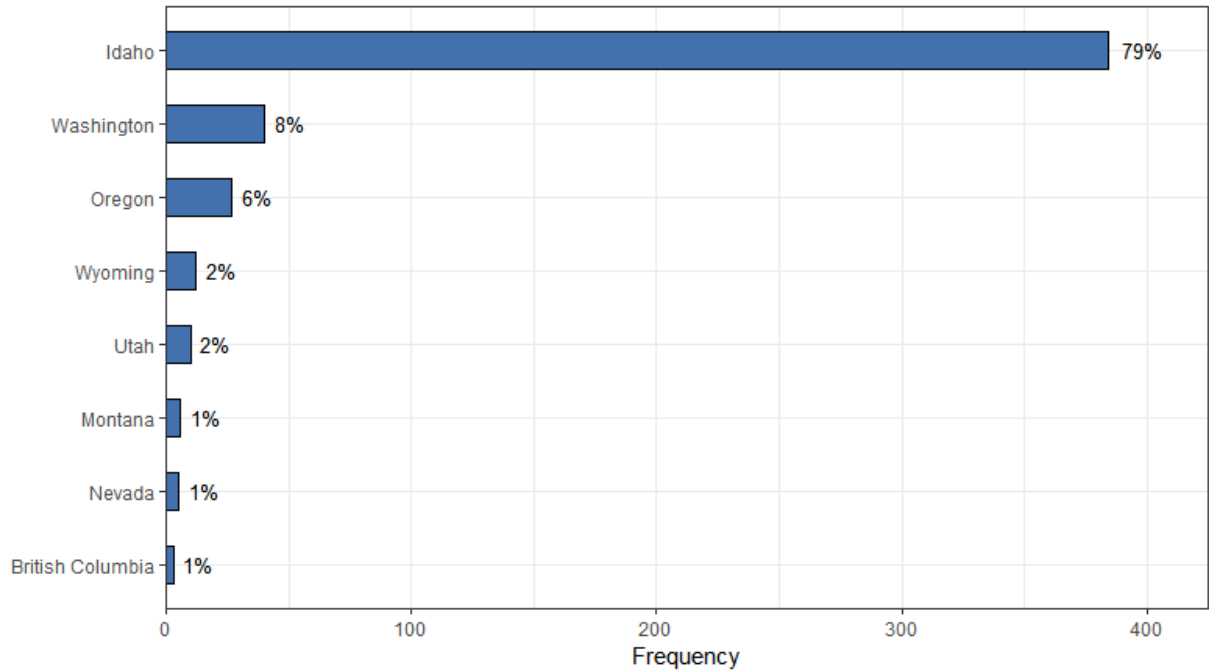


Figure 177. Originating States for Private Transport Shipments Destined to Idaho

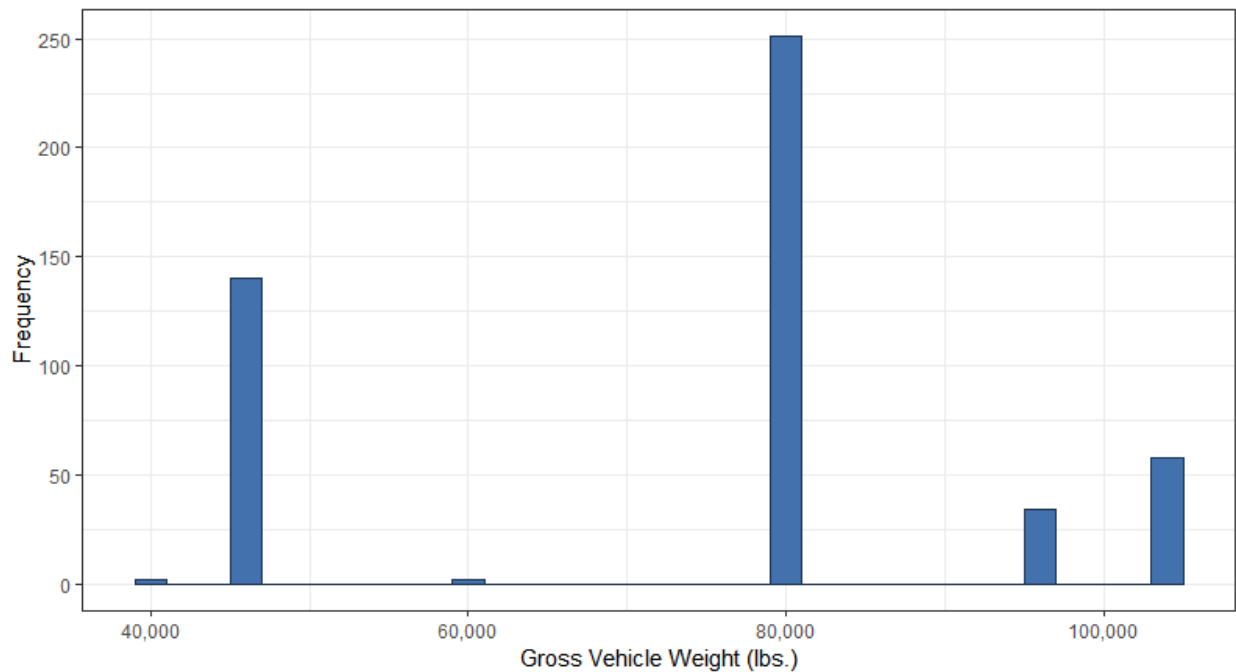


Figure 178. GVW Distribution of Private Transport Shipments Destined to Idaho

Refrigerated Haulage

Figure 179 shows Refrigerated Haulage shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized Figure 180. In addition, GVW distribution of inbound shipments is observed in Figure 181.



Figure 179. Refrigerated Haulage Shipments Destined to Idaho

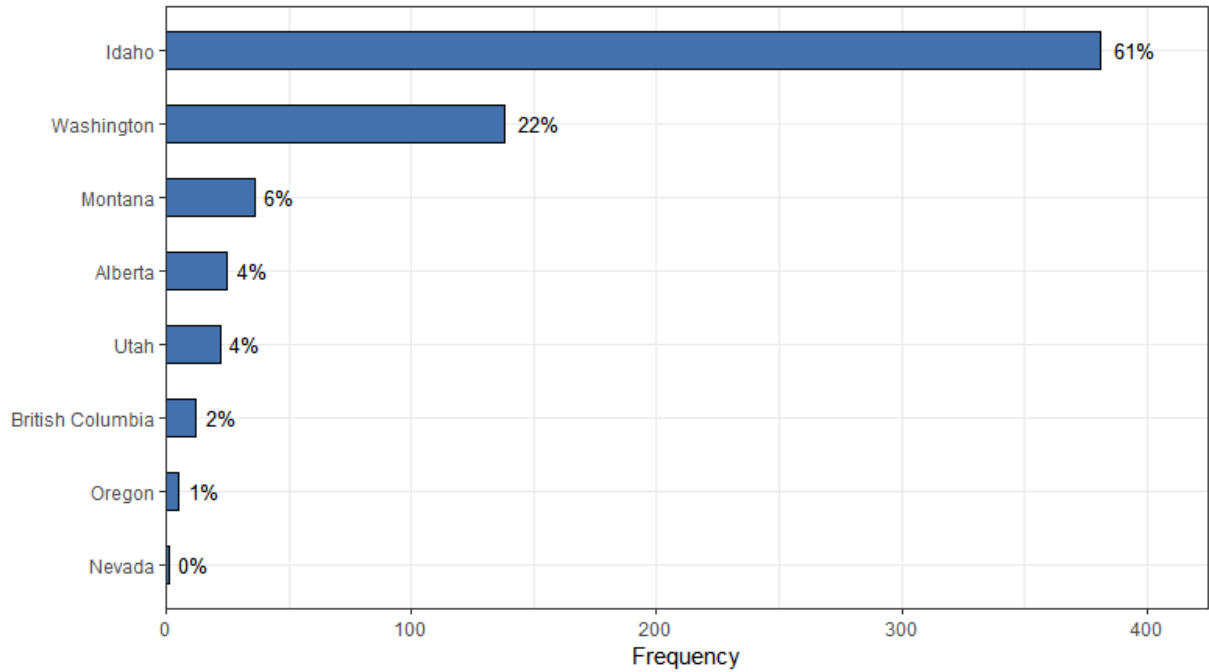


Figure 180. Originating States for Refrigerated Haulage Shipments Destined to Idaho

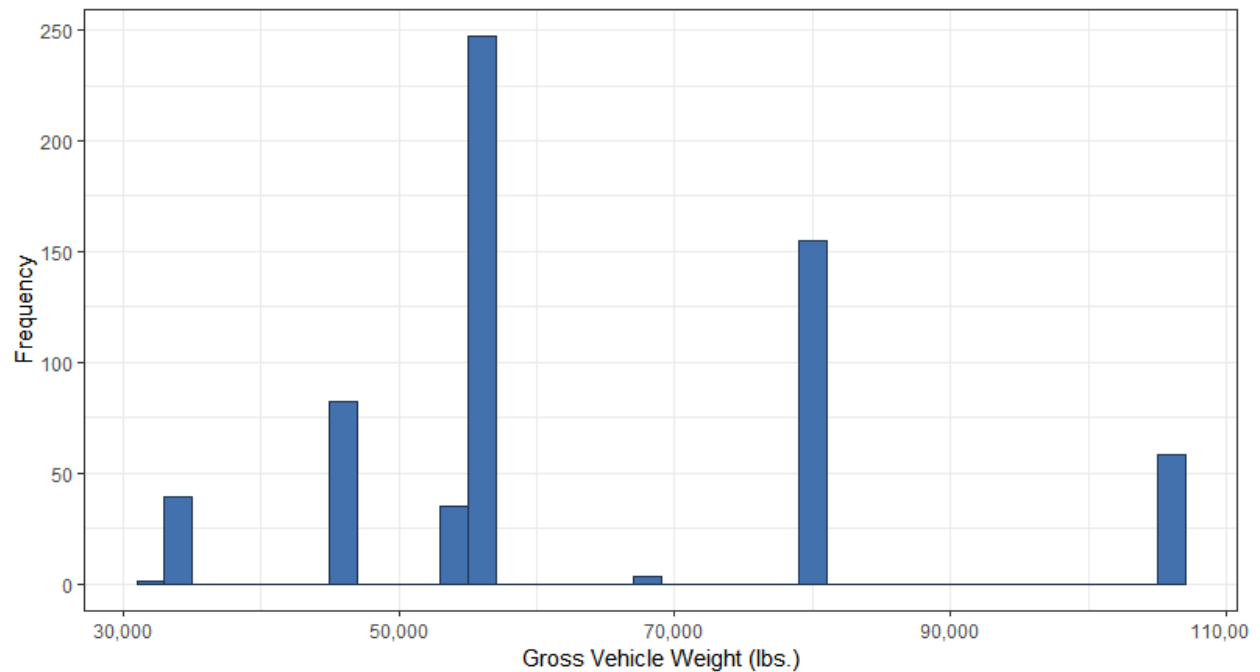


Figure 181. GVW Distribution of Refrigerated Haulage Shipments Destined to Idaho

Rental, Hiring, and Real Estate Services

Figure 182 shows Rental, Hiring, and Real Estate Services shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 183. In addition, GVW distribution of inbound shipments is observed in Figure 184.



Figure 182. Rental, Hiring, and Real Estate Services Shipments Destined to Idaho

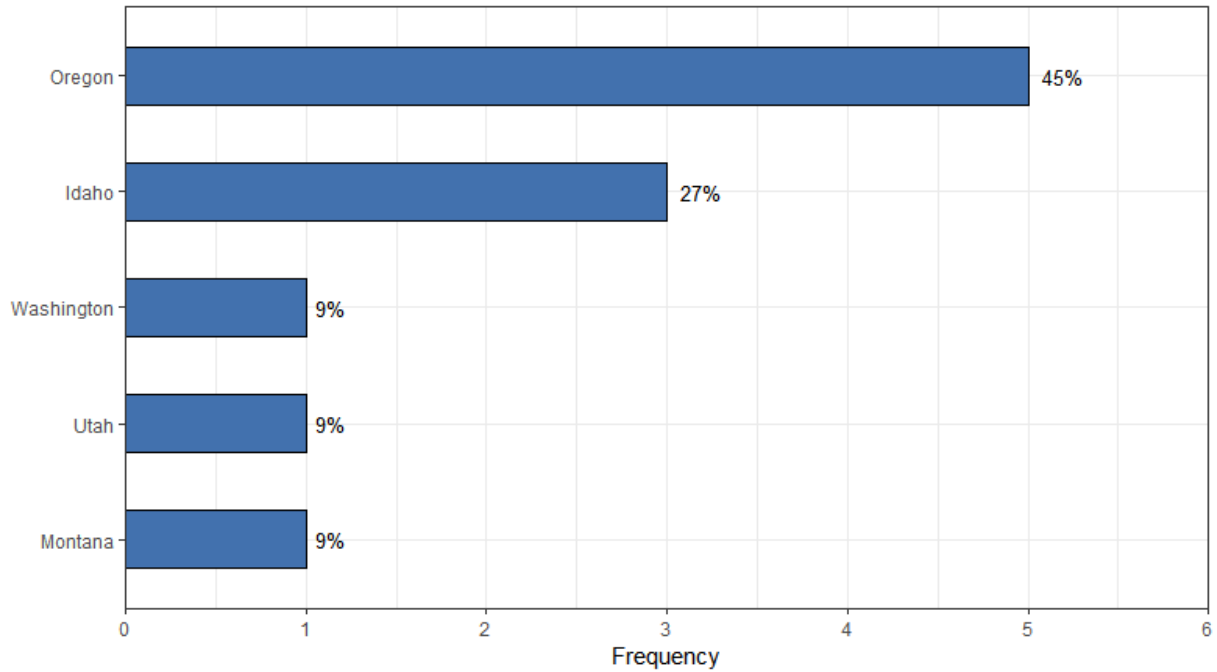


Figure 183. Originating States for Rental, Hiring, and Real Estate Services Shipments Destined to Idaho

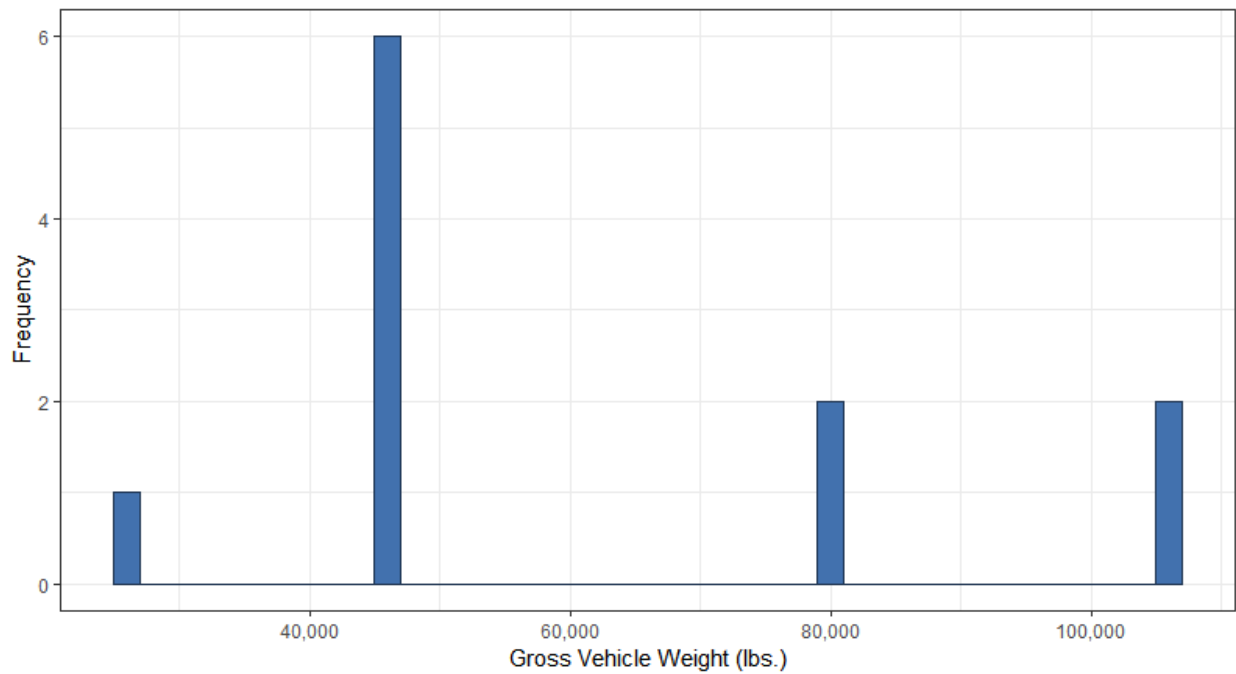


Figure 184. GVW Distribution of Rental, Hiring, and Real Estate Services Shipments Destined to Idaho

Retail Trade

Figure 185 shows Retail Trade shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 186. In addition, GVW distribution of inbound shipments is observed in Figure 187.



Figure 185. Retail Trade Shipments Destined to Idaho

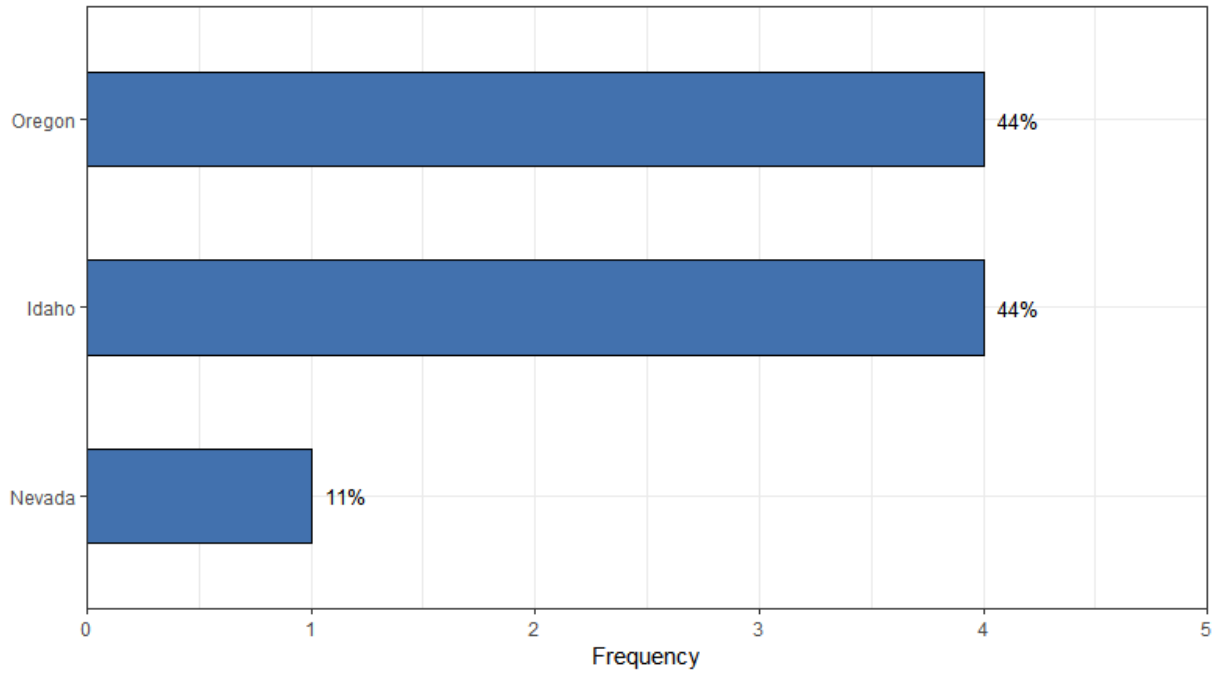


Figure 186. Originating States for Retail Trade Shipments Destined to Idaho

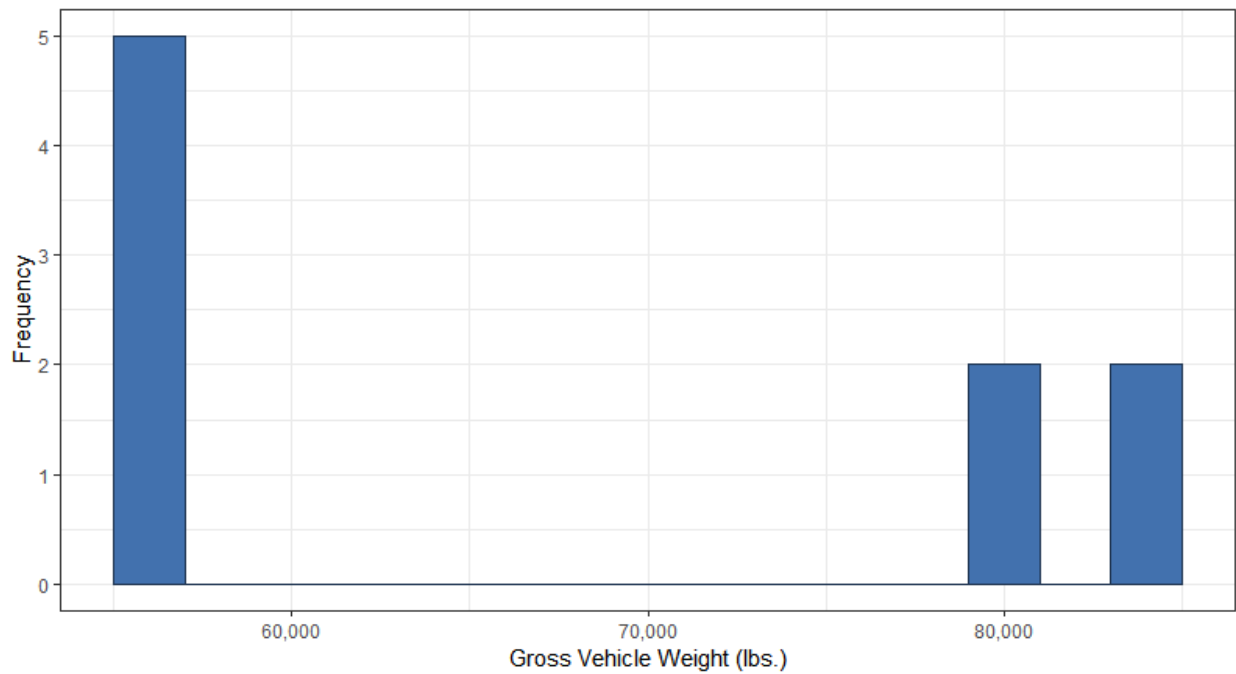


Figure 187. GVW Distribution of Retail Trade Shipments Destined to Idaho

Steel and Aluminum

Figure 188 shows Steel and Aluminum shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 189. In addition, GVW distribution of inbound shipments is observed in Figure 190.

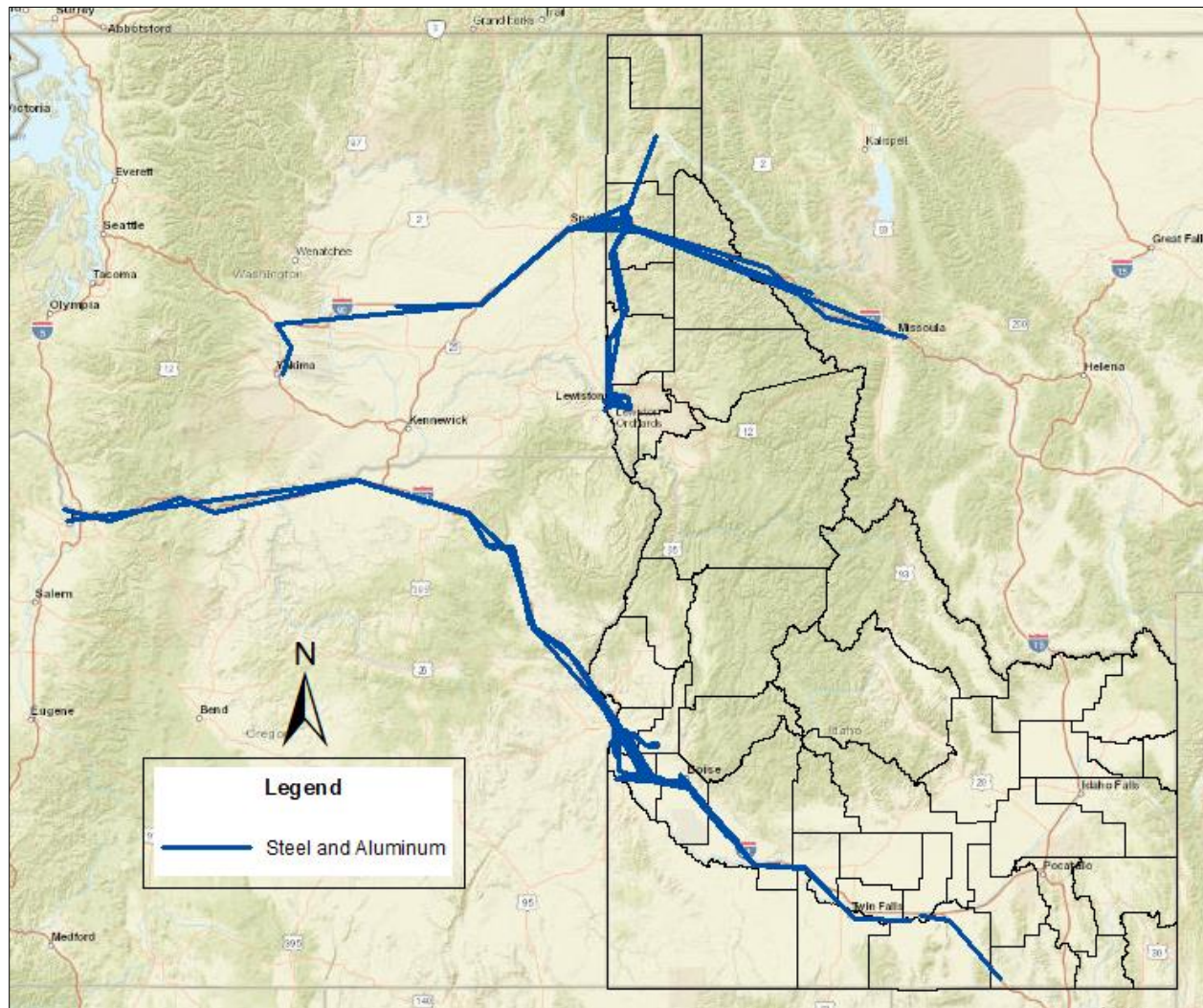


Figure 188. Steel and Aluminum Shipments Destined to Idaho

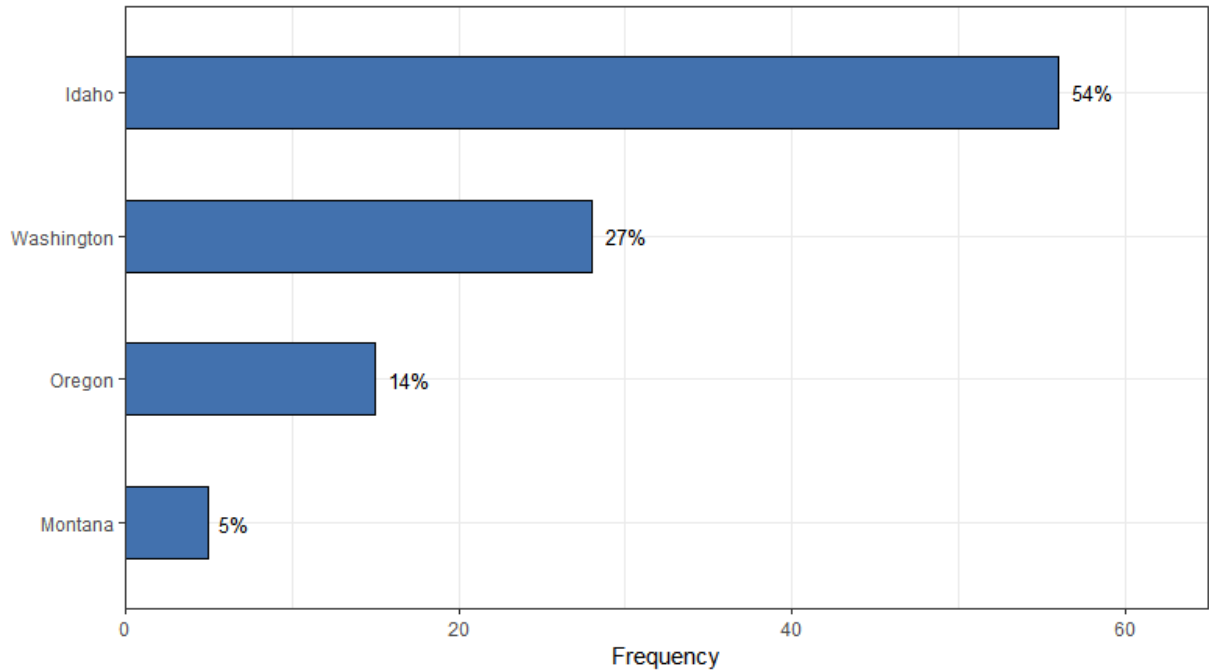


Figure 189. Originating States for Steel and Aluminum Shipments Destined to Idaho

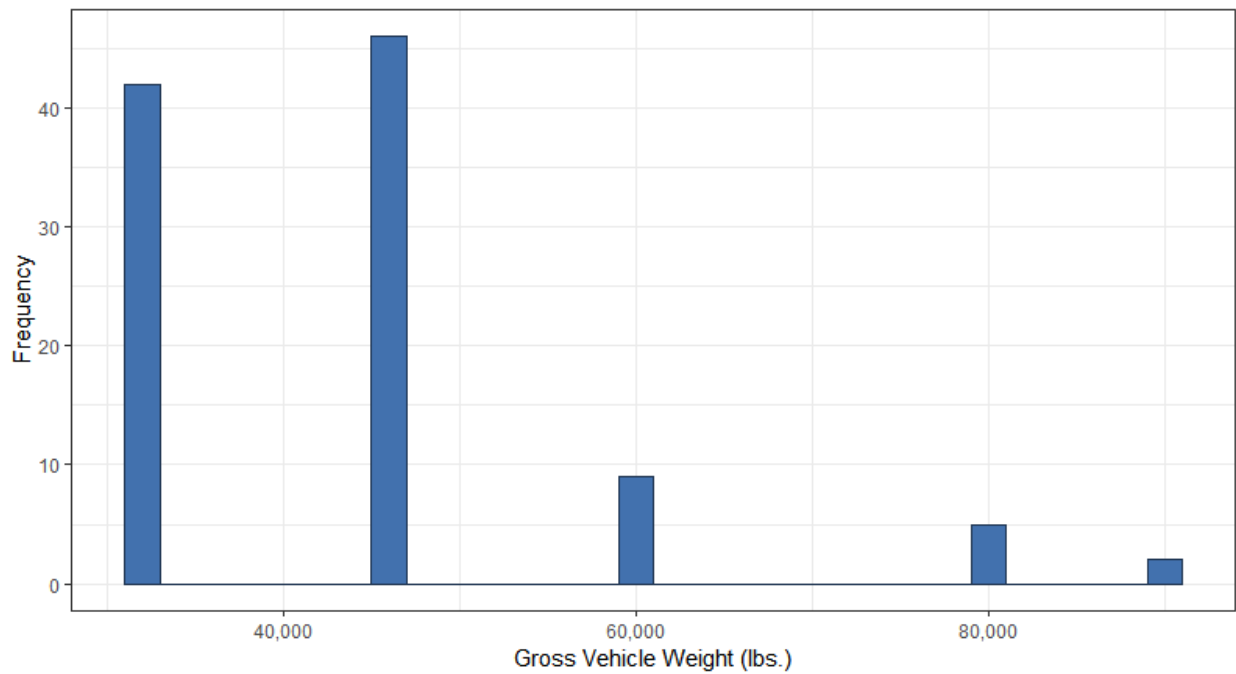


Figure 190. GVW Distribution of Steel and Aluminum Shipments Destined to Idaho

Transport Equipment, Machinery and Equipment Manufacturing

Figure 191 shows Transport Equipment, Machinery and Equipment Manufacturing shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 192. In addition, GVW distribution of inbound shipments is observed in Figure 193.

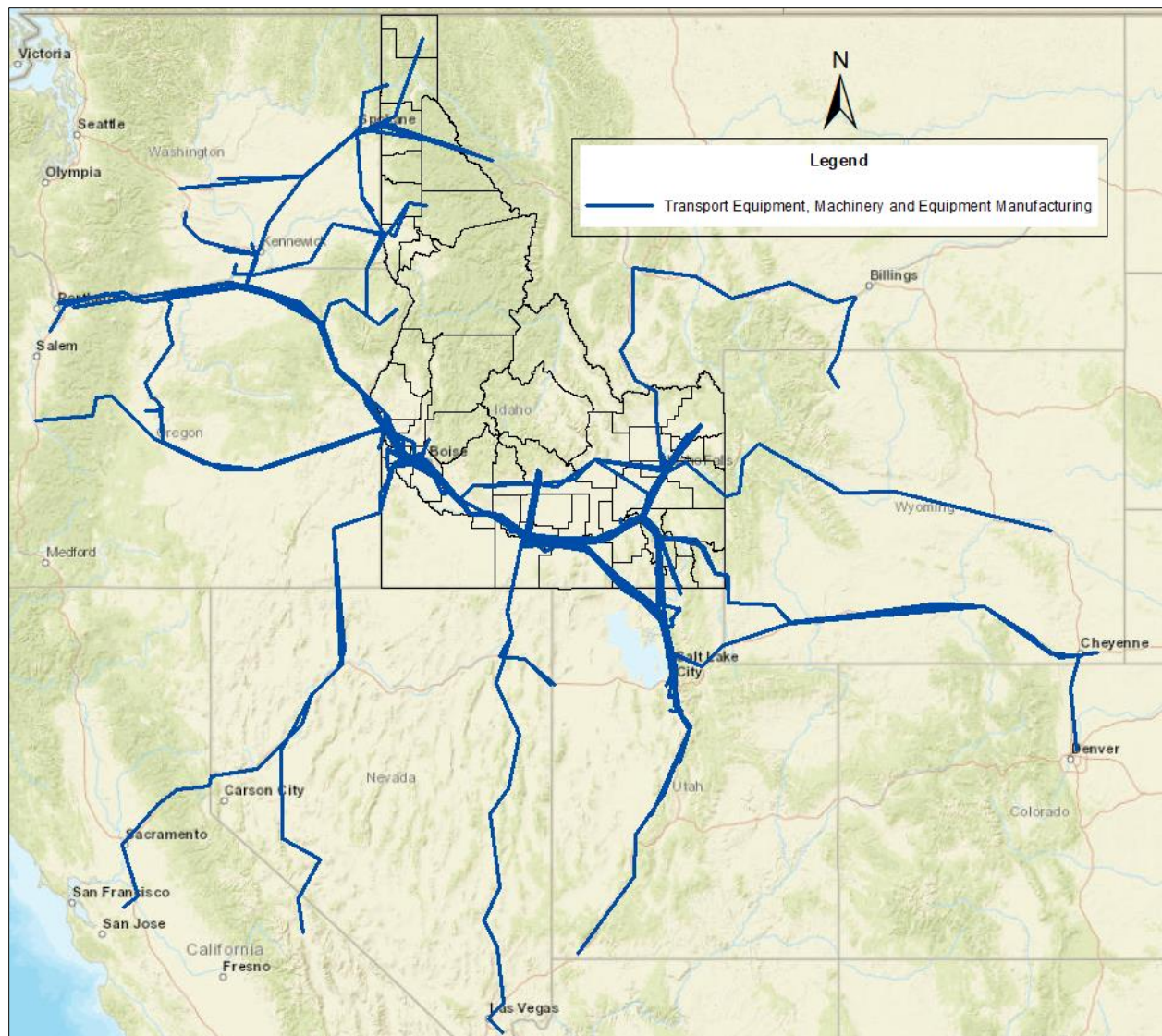


Figure 191. Transport Equipment, Machinery and Equipment Manufacturing Shipments Destined to Idaho

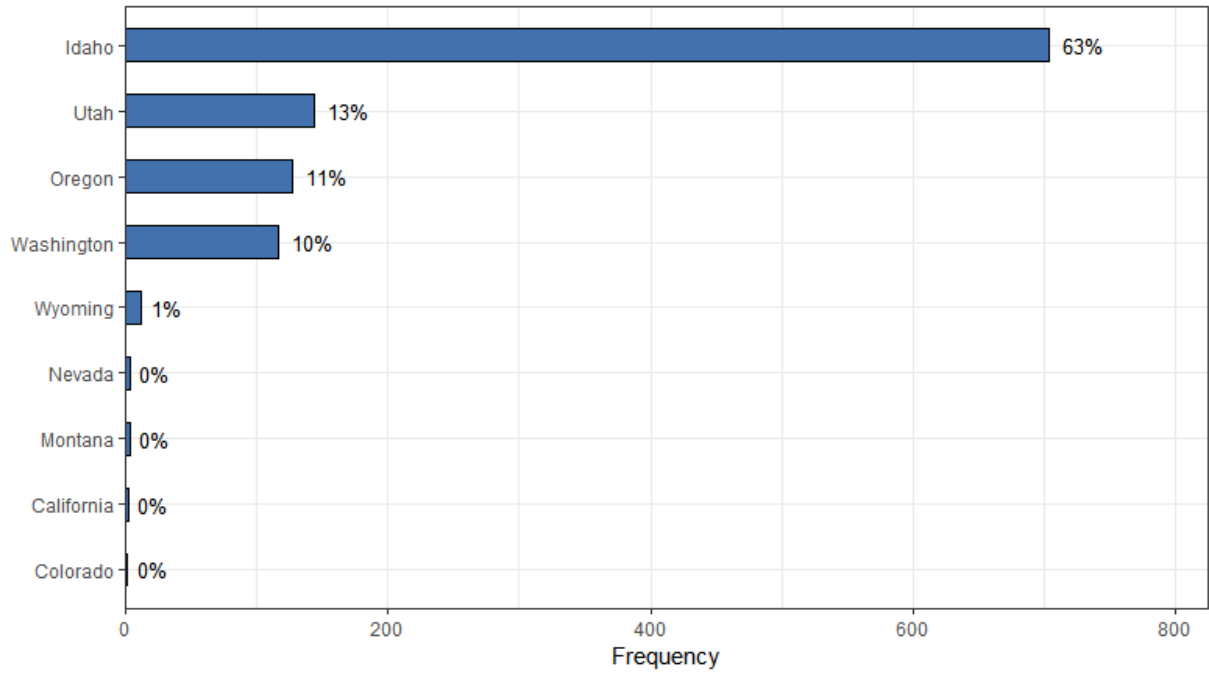


Figure 192. Originating States for Transport Equipment, Machinery and Equipment Manufacturing Shipments Destined to Idaho

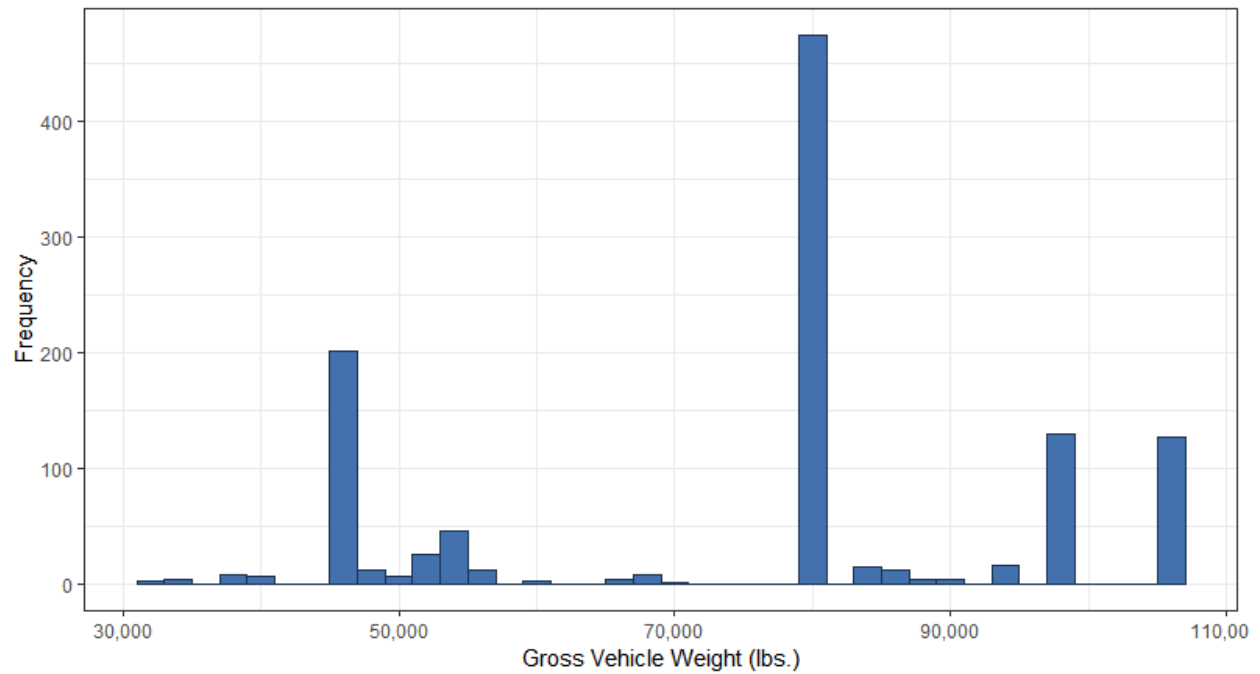


Figure 193. GVW Distribution of Transport Equipment, Machinery and Equipment Manufacturing Shipments Destined to Idaho

Transport, Postal and Warehousing

Figure 194 shows Transport, Postal and Warehousing shipments that are destined to Idaho. According to EROAD records, just one shipment is destined to Idaho. This shipment originated from Oregon and had a recorded GVW of 42,000 pounds.

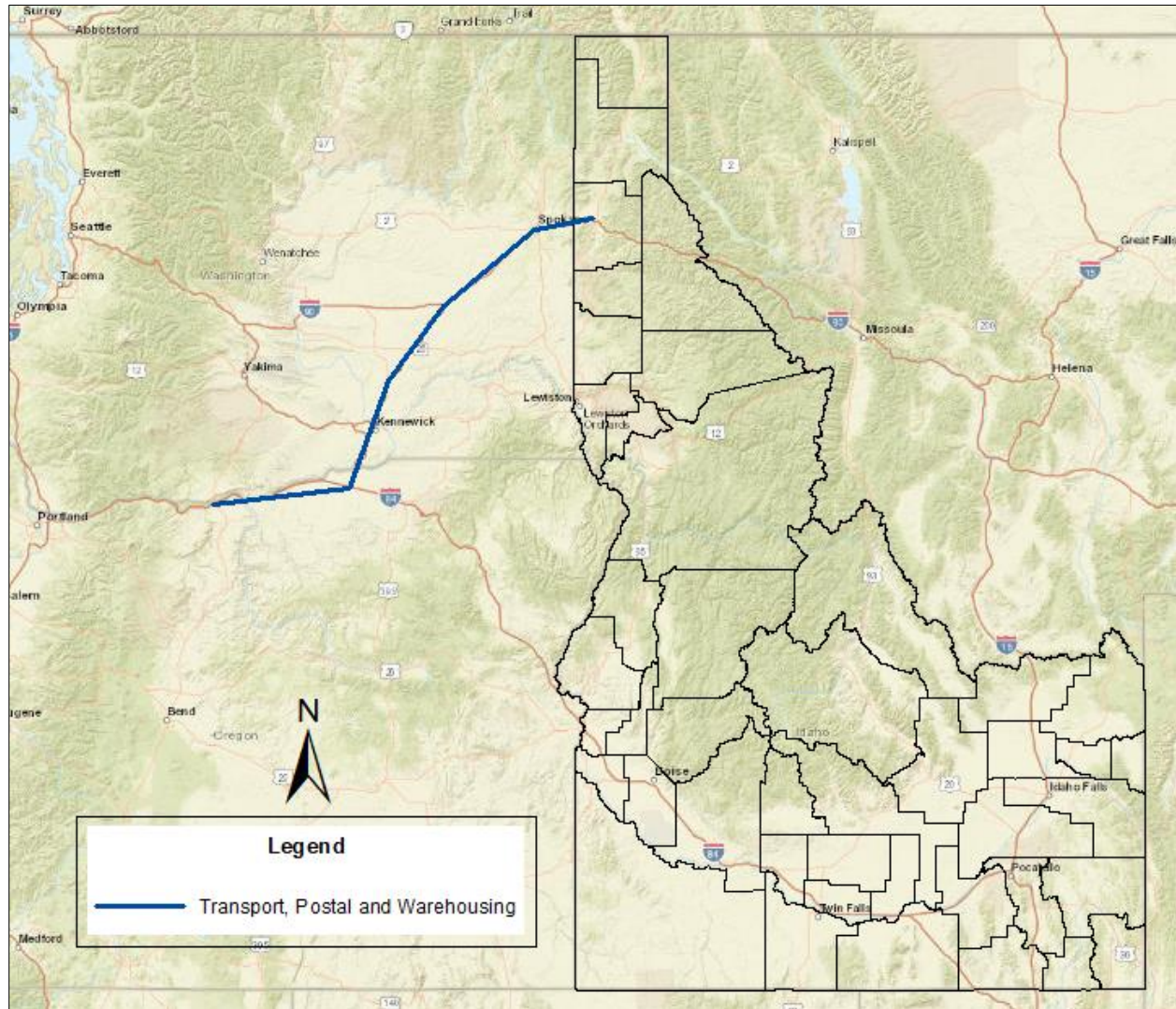


Figure 194. Transport, Postal and Warehousing Shipments Destined to Idaho

Wood and Paper Products Manufacturing

Figure 195 shows Wood and Paper Products Manufacturing shipments that are destined to Idaho. According to EROAD records, the proportion of shipments by which state they are originating from is summarized in Figure 196. In addition, GVW distribution of inbound shipments is observed in Figure 197.

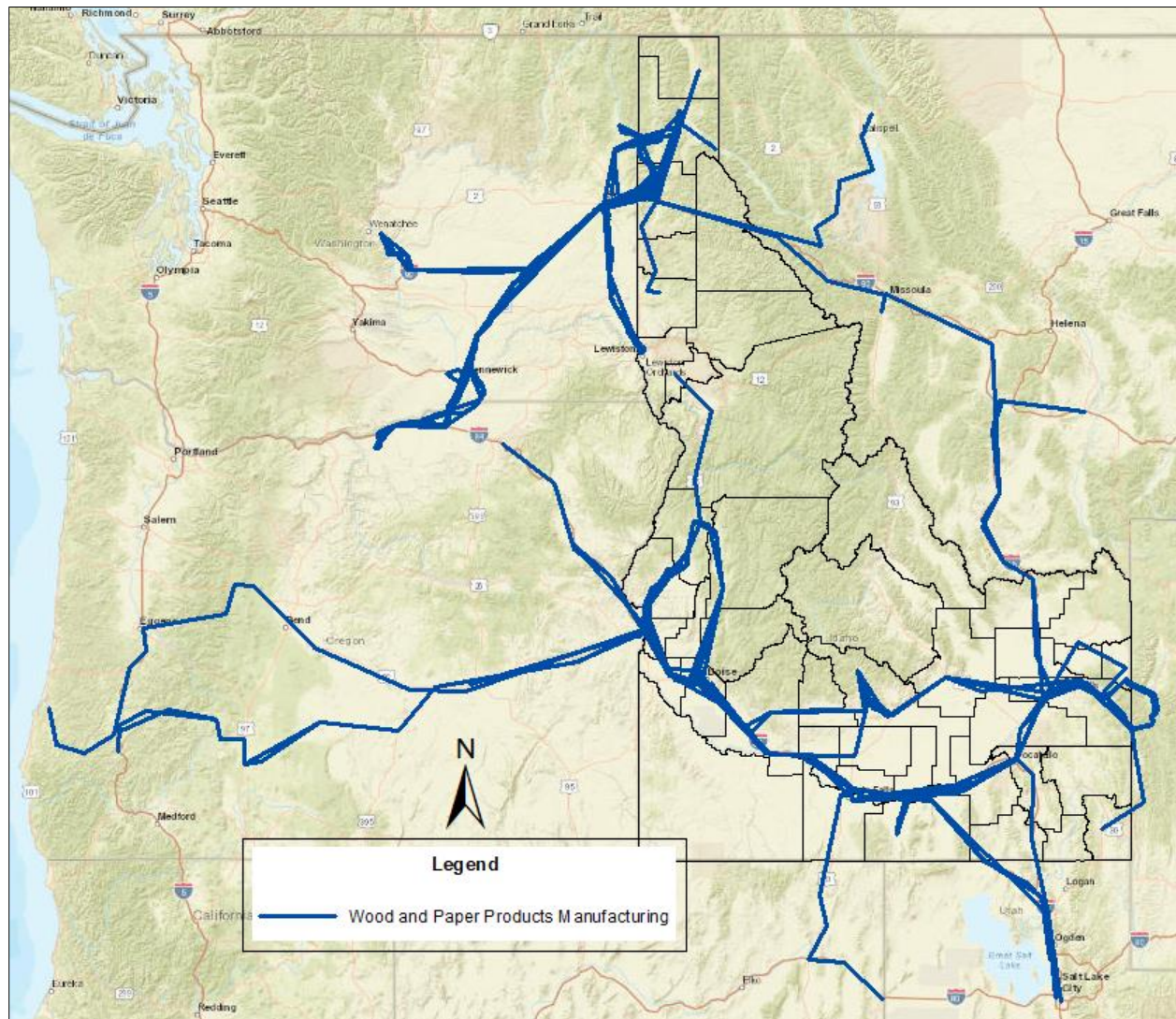


Figure 195. Wood and Paper Products Manufacturing Shipments Destined to Idaho

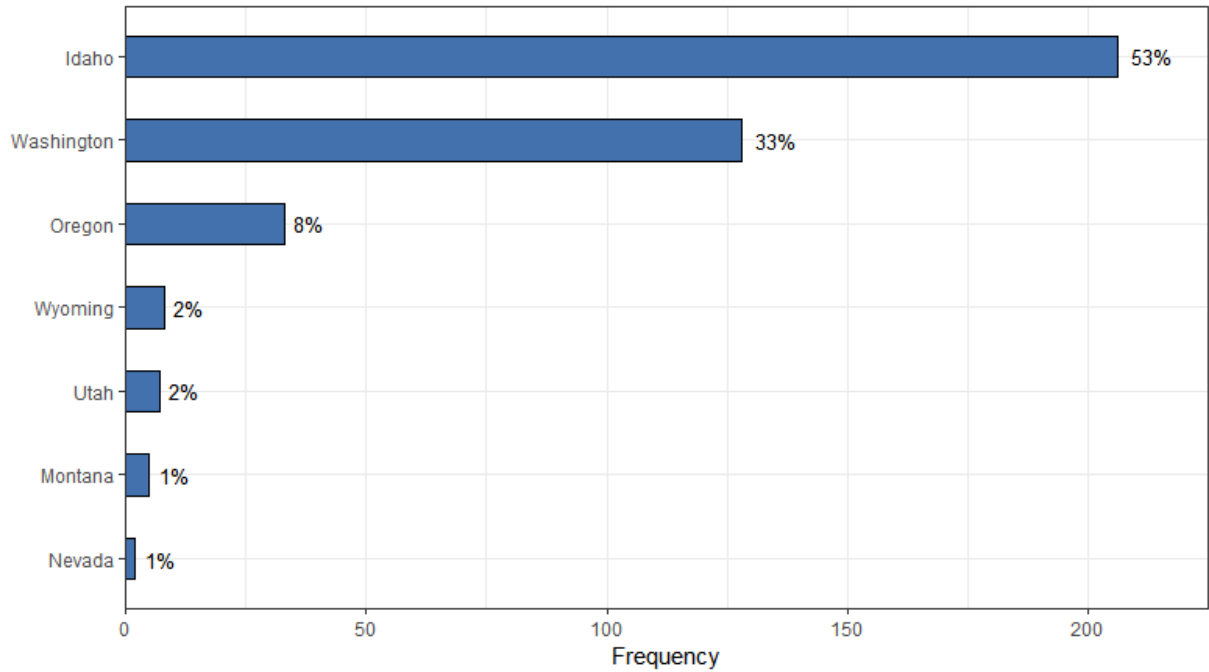


Figure 196. Originating States for Wood and Paper Products Manufacturing Shipments Destined to Idaho

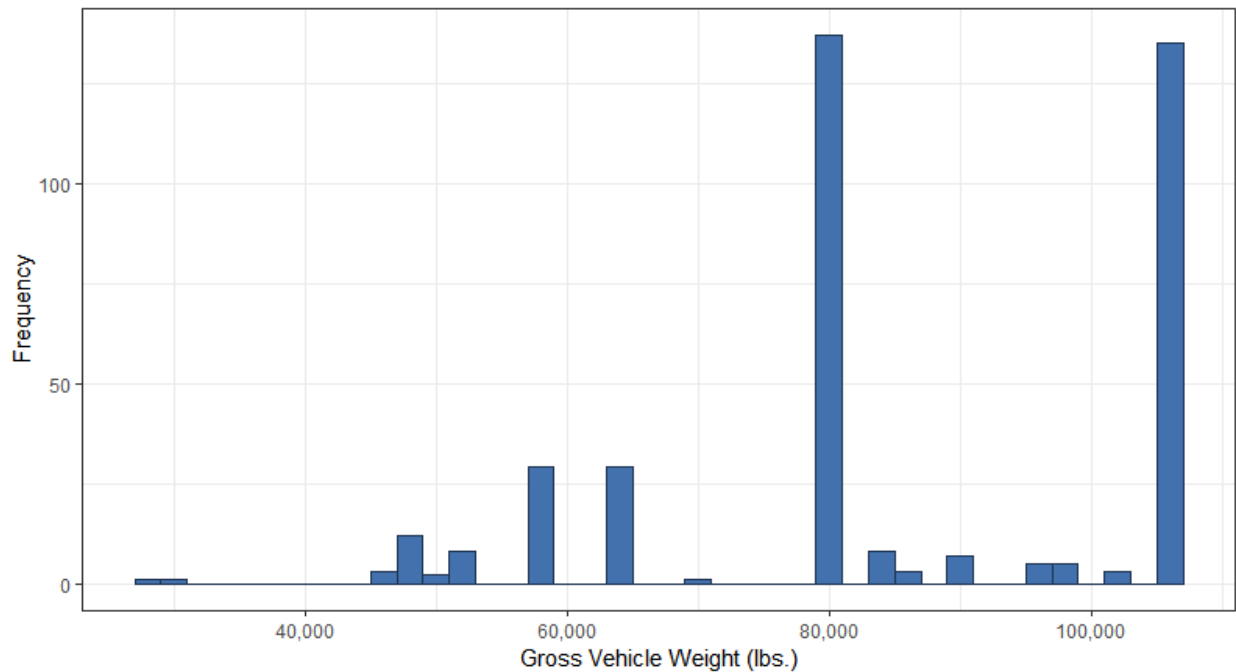


Figure 197. GVW Distribution of Wood and Paper Products Manufacturing Shipments Destined to Idaho